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The contest on The Operation of Large Classification Yards has attracted much attention among railway officers and a number of excellent contributions have already been received. As only a few days remain before the contest closes we desire to emphasize its importance again that others contemplating preparing discussions of this subject may send them in at once in order that the contest may be made as valuable as possible to men engaged in this phase of railway operation. Briefly, this contest embraces a discussion of all problems connected with the operation of large classification yards as distinguished from the more properly termed terminal yards. Contributions should be plainly marked Contest on Yard Operation, and should be sent to the editor of the *Railway Age Gazette*, 608 South Dearborn street, Chicago. They must be received not later than June 1 to be considered by the judges of the contest. Prizes of $50 and $35 will be awarded the two best papers received and all others accepted and published will be paid for at our regular space rates.

Contest on Yard Operation

The Pennsylvania Public Service Commission has followed the commissions of New York state and of Canada in ordering the railways to continue their allowances to short industrial railroads, which allowances have been declared by Mr. Brandeis and the Interstate Commerce Commission to be, in most cases, exorbitant and illegal, and which, so far as concerns the United States Steel Corporation and a few other large mill owners, have been discontinued on interstate traffic. The apparent conflict between the views of the federal and the state authorities on this matter, of which much has been made in the press, is, probably, far less important than it seems. There may be no real conflict at all. The essential thing is the reasonableness of the compensation for the service on the industrial road, and the Interstate Commerce Commission itself has postponed judgment on many cases. The Pennsylvania commission was forced to class the short roads as common carriers because the point had already been decided by the Supreme Court of the state, but it is going to investigate the matter further. Evidently there is a long legal contest ahead; for, not only the confusion of state and federal authority, but also the confusion incident to all complicated freight-rate puzzles, seems to afflict this controversy in a marked degree. But the State (or the States) is committed irrevocably to the duty of making all transportation rates, everywhere, reasonable and just; and shall such a power be thwarted by a saw mill or an iron furnace? The lawyers may be trusted to settle things if they are allowed sufficient time. The question as to what will be a "sufficient" time, we are not so rash as to venture upon!

Industrial Railroad Rates in Pennsylvania

In an editorial in our issue of May 8, page 1014, we reviewed the brief filed by Louis D. Brandeis, special counsel for the Interstate Commerce Commission, in the rate advance case. A careful reading of the oral argument made by Mr. Brandeis in this case on April 30 and May 1 discloses that in order clearly and fully to understand the position taken and the conclusions reached by him it is necessary to consider his brief and his oral argument together. His brief considered alone conveyed the impression that he was criticizing the efficiency with which the railways of the United States are operated, for in it he contended that many other classes of concerns had been able to increase wages without finding it necessary to increase their rates or prices. But the typewritten report of his oral argument shows that in it he did not criticize the efficiency with which our railways handle freight. He gave it the highest praise. What he did point out is that the roads have been unable to introduce similar economies in the handling of their passenger traffic, and that, in consequence, the expense incurred in the passenger service has increased so much more in proportion than the earnings from passengers, mail and other passenger train business, that on all the roads in eastern territory which tried to allocate their freight and passenger expenses, the passenger business is being handled at a loss. In some cases passenger train operating expenses actually exceed passenger earnings; and in no case are there any considerable net earnings from the passenger business with which to pay a return on the investment properly assignable to passenger service. The points made by

Mr. Brandeis' Interesting Oral Argument

Mr. Brandeis in his oral argument are so pertinent and important that we publish an abstract of it elsewhere which we are sure our readers will peruse with much interest.

Development Work on the Frisco

The local banker has the confidence of the community and his advice is always listened to with attention and respect. He can do much toward influencing his clients to change and improve their methods of doing business. The work of the department of development on the Frisco was carefully planned to produce rapid and concrete results, as is shown in the article printed elsewhere in this issue; but the remarkable progress which was made in the first year of existence of this department is due to quite a large extent to the co-operation of the local bankers in using their influence to get the farmer to improve his methods. It has always been impossible for the representatives of the federal or state agricultural departments, or the railroads, to reach all of the farmers in the same way that they may be reached and influenced by the bankers. The demonstration farms conducted along new and unique methods made such a strong impression upon the different communities last year that their number has been very greatly increased this year and the bankers have been enthused and spurred on in their efforts to co-operate with the railroad in building up and developing the agricultural, horticultural and dairying industries. The results which have been obtained thus far read almost like a fairy tale.

THE FISCAL YEAR AND THE ACCOUNTING DEPARTMENT

THE accounts of all properly managed railroad companies are kept month by month in such a way that there should be no difficulty whatsoever from the comptroller's point of view in changing from a fiscal year ending June 30 to a calendar year ending December 31. The advantages to the accounting department are minor compared to the importance to the transportation and maintenance of way departments, but are nevertheless well worth consideration. While the accounts are kept month by month, a great many of the statistics which are included in the annual report to stockholders are worked up but once for the year. On roads reporting for June 30 these statistics have to be prepared during June, July and August. This is the vacation time of the year. It is the time of the year when it is hardest to do accurate work and when overtime is most detrimental to health and to accurate work.

The annual reports are sent out to stockholders in the latter part of August, September and October, some few coming along in November and December. In some ways this is the least desirable time of the year to send reports to stockholders, since the larger stockholders are either on their vacations or just returning to their winter's work. The report, therefore, is likely to receive less attention than it would coming in the latter part of February or March.

The chief objection to making a change from June to December is that it will necessitate recasting previous accounts whenever comparisons with previous years are required. Such a change would necessitate a certain amount of additional work in the general offices of railroads for some years. On the other hand, within a few months the Interstate Commerce Commission will put into effect a new classification of revenues and expenses for steam railroads which will necessitate a certain amount of recasting of accounts of previous years for comparative purposes in any case, and it would be quite desirable that if a change is to be made in the fiscal year it should be made now rather than to wait until after the new classification has been in use for some years.

The reasons for the change which are so important to railroad managements do not apply with so much force to the Interstate Commerce Commission year. Although at present the Interstate Commerce Commission is two or more years behind in its own statistical annual reports, it is considered important by the commission to have current figures available for Congress when it convenes in the fall. Even, however, if the commission does not make a change the railroads should.

The Pennsylvania and New York Central and other roads which now report to their stockholders for the calendar year and make returns to the Interstate Commerce Commission for the fiscal year find in general that it is an advantage rather than a disadvantage to have these two different periods, since figures for the Interstate Commerce Commission can be worked up at a time that the office force is not under pressure to work up statistics for the stockholders' annual report.

In connection with this change from the fiscal year to the calendar year, which would be of so much advantage to the operating and engineering officers of railroads, it is well to call attention to a rather common mistaken notion which operating men have of what is permissible in the way of distributing expenses over the year. There are certain expenses, such as the original cost less depreciation of equipment retired, which under the present rules of the commission may properly be distributed throughout the year rather than charged wholly in the month in which the retirement takes place. A good many operating officers have a feeling that these expenses ought to be charged largely against the earnings of months in which there is heavy traffic; that it is not good policy to charge one-twelfth of these expenses to each month, including the months of lean business. This is a mistake. If certain expenses are to be distributed over the year they must be distributed on a perfectly uniform basis, otherwise a management lays itself open to the accusation of juggling its accounts. Trying to adjust expenses theoretically to earnings is an entirely wrong conception of the function of accounts. Adjusting actual expenses to earnings may be a necessity which, although regrettable, is unavoidable. The accounts should merely record this fact and when an expense account shows a falling off it should only be because actual expenses are being cut and should never be because a particular month is not being charged with its full share of the expenses which are common to each month. It would be as logical to say that taxes for the entire year should be charged to the earnings of the six months of heavy traffic as to say that the cost of abandoned property for the entire year should be charged at rates varying with the amount of business done.

THE LONG ISLAND

THE Long Island did not find 1913 a very satisfactory year. The road under present conditions operates under very adverse conditions. But 26.26 per cent. of its total operating income is derived from the hauling of freight. Its passenger business is very largely commutation business, which is always classed as the least remunerative of railway services. The railroad, in addition, is going through a transition stage from operation by steam to operation by electricity. The resulting duplication of facilities and the attending impediment of operation show very decidedly in operating expenses.

In 1913, the Long Island received a total revenue from rail operations of $12,204,738. This is an increase of $1,018,081 over 1912, but the comparison is not an exact one because, during the year, the Long Island turned over its express business to the Adams Express Company, with the result that the revenues from rail operations include a revenue from express business of $437,832, which was formerly included in the revenue from outside operations. Operating expenses amounted to $8,847,163, an increase of $713,118, so that the net revenue from rail operations was $3,357,574, an increase of $304,963 over 1912, but in reality a decrease in view of the change in the method of handling the express business. Outside operations resulted in a net revenue of but $97,510, a most decided decrease from the $646,983 of the year before, due principally to the loss of the express business and the falling off in ferry earnings resulting from the continued diversion of traffic to and from Manhattan by way of the Pennsylvania tunnels, the Interborough subway from Flatbush avenue and the trolleys over the Queensborough bridge. The loss, therefore, is not a

great one; the improved means of communication, for example, may cause a loss of earnings from one source, but they are already proving very valuable factors in increasing the Long Island's business by making its territory more accessible to New York City and travel over its lines more convenient and desirable. The amount paid in taxes was $762,864, so that the total operating income was $2,692,220, which is a decrease of $324,300 from the year 1912. Other income likewise showed a decrease. The gross income was $3,422,537, a decrease of over 10 per cent. Deductions from this gross income amounted to $4,400,522. This, in its turn, is a decided increase. The result is that the road came through the year 1913 with the very considerable deficit of $977,985. This was $695,294 greater than in 1912 and is the greatest since its control by the Pennsylvania Railroad.

The Long Island Railroad's most important task has been to make the territory which it serves easily accessible from New York City. As mentioned above, much of the work to that end has been carried out by the construction of the Pennsylvania and Interborough tunnels. The Long Island itself, however, has also made large expenditures to the same end. The road's total property investment on December 31, 1913, was $67,975,596. It is significant that that amount includes an increase of investment since June 30, 1907, of $21,864,954, and that approximately $50,000,000 has been added to the cost of the road and equipment since 1900. The increase over 1912, in particular, is not quite $4,500,000, and it does not seem that the rate of increase for the year to come will be much less. The railroad has about completed its extensive improvements at Jamaica, and in 1913 expended on additions and betterments at that place, $1,476,865. There is also an item of $668,149 for the improvement at Bay Ridge and the elimination of grade crossings in Brooklyn, which are still under way. Over 30 per cent. of all the street crossings of the Long Island in the boroughs of Brooklyn and Queens are either over or under grade; work is now under way which will eliminate 33 more of those which are now at grade. The advantages derived from the various efforts to improve the transportation facilities have been many. For one thing there has been a decided increase in the population of the island. There has also been an increase in market gardening, and in many places enterprising truck gardeners have replaced the former only fairly progressive small farmers. There have naturally been great increases in building activity and advances in the price of land. The railroad, itself, has gained, however, because of the resulting increases in its commutation and attendant passenger business and the increased freight traffic in agricultural products, building supplies and other goods.

The Long Island Railroad, as a separately operated enterprise, would indeed be in a very weak financial position. It has paid no dividends on its stock since 1896, and has earned the interest on its bonds in but two years, 1905 and 1909, since 1903. Without the aid of the Pennsylvania Railroad, which has owned a majority of its stock since 1900, it undoubtedly could not carry on the extensive improvements which it has so well in hand. The Long Island's capital stock outstanding is but $12,000,000, or $30,075 per mile. Its bonded indebtedness, including company bonds to the amount of $51,747,654, the bonds of subsidiary companies, equipment trusts, mortgages and obligations for advances received for construction, equipment and betterments is, on the other hand, $60,236,412, making a total capitalization per mile of about $181,000. The total capital liabilities thus amount to $72,236,412, comparing with $71,930,964 of capital assets. The working liabilities are also in excess of working assets, since they amount to $16,419,670, as compared to but $8,274,958. Of the working assets, $738,642 is cash. There is also the fact that the company's total debit to profit and loss has reached the very large total of $5,200,966.

A study of the traffic conditions shows the peculiar position in which the Long Island is placed. The freight business is exceedingly small and practically all of the road's traffic goes but very short distances. The total freight revenue in 1913 was $3,328,684; the number of tons carried was 4,147,072, and the number of ton miles was 93,255,726, these being decreases of 3.32, 2.84 and 7.55 per cent. respectively. The average haul per ton was but 22.49 miles, and the average train load but 154.77 tons. The company received an average ton mile revenue of 3.569 cents; the average cost per ton mile, however, being 2.090 cents (an increase of 20.53 per cent. over 1912) so that the average net revenue per ton mile was 1.479 cents. The railroad's passenger train revenue in 1913 was 70.50 per cent. of the total revenue. The passenger revenue alone was $7,889,292, an increase of $570,775 over 1912. The number of passengers carried was 40,606,183, and it is significant that almost one quarter, or 9,619,071 of these, traveled in and out of the Pennsylvania terminal in New York City, and that the Long Island's business through that station has increased from 6,224,429 in 1911 and 7,753,958 in 1912. The average distance each passenger was carried was 14.62 miles.

The fact that the major portion of the passenger business was suburban is also shown in the fact that the average revenue from each passenger was but 19.43 cents and that the average number of passengers per car mile was 27. The average revenue per passenger per mile was but 1.330 cents. It has been figured that the average cost per passenger mile was 1.268 cents, so that the average net revenue per passenger per mile was .062 cents; and even that low figure is a decrease of 10.14 per cent. from 1912. The Long Island is doing its best to increase its freight and commutation passenger business. It may be seen that it is meeting with success as far as the carrying of passengers is concerned. Its success with freight traffic is not so marked. There have, however, been decided increases in the amount of products of manufactures carried and smaller but encouraging increases in products of agriculture. In 1913, there was a decided decrease in merchandise and miscellaneous items and the annual report states that this is primarily due to general depression affecting the building developments at various points on the island. The discontinuance of road building by the state and counties has also resulted in decreased revenue.

The Long Island in 1913 suffered general and very serious increases in operating expenses. The following shows the per cent. of each class of expenses to the total operating revenues:

	1913	1912
Maintenance of way and structures	13.07	13.14
Maintenance of equipment	11.64	11.59
Transportation expenses	43.59	44.04
Traffic expenses	1.41	1.43
General expenses	2.71	2.52

The following table compares the principal figures for operation in the fiscal year ended December 31, 1913, with the 1912 fiscal year:

	1913	1912
Average mileage operated	395	395
Freight revenue	$3,327,768	$3,435,643
Passenger revenue	7,814,299	7,245,388
Total operating revenues	12,204,738	11,186,656
Maint. of way and structures	1,595,393	1,469,757
Maint. of equipment	1,420,702	1,296,053
Traffic and expenses	181,072	160,155
Transportation expenses	5,319,294	4,925,936
General expenses	330,703	282,144
Total operating expenses	8,847,163	8,134,045
Taxes	762,864	683,074
Operating income	2,692,220	3,016,521
Total income	3,422,536	3,607,179
Net deficit	977,985	282,690

NEW BOOKS

Railway Statistics of the United States of America for the Year Ending June 30, 1913. By Slason Thompson, Director of the Bureau of Railway News and Statistics. 137 pages. 5½ in. by 8¼ in. Bound in paper. Published by the author at Chicago.

This is the tenth edition of Mr. Thompson's annual volume of railway statistics, which is valuable because of its comprehensiveness and because it appears so far in advance of the official statistics of the Interstate Commerce Commission. It is compiled from returns identical with those made to the Interstate Commerce Commission by roads representing 96 per cent. of the railway mileage and 98 per cent. of the total traffic of the United States for the year. The statistics presented not only cover the principal features of railway construction, financing, maintenance, operation and traffic for the year, but include comprehensive comparisons with previous years, using the official figures for

1911 and preceding years, and with railways in other countries.

The section relating to foreign railways has been greatly enlarged and now presents a comprehensive tabulation of the railway statistics of the principal countries of the world, derived from the official returns. In conclusion Mr. Thompson recommends that the commission be relieved of the duty of collecting statistics, suggesting that this might well be entrusted to a bureau of the Department of Commerce and Labor so that they may not "be compiled under the sole supervision of the authority charged with their judicial interpretation." He also recommends that the investigation of accidents should be vested in a board of inspectors independent of the commission.

"The average receipts of 7.27 mills per ton mile," says the report, "is the highest achievement of American railway efficiency. When it is considered that everything entering into the movement of one ton one mile costs from 10 to 30 per cent. more than it did in 1899, when the previous low mark was touched, it challenges credulity. Moving freight the world over is the most important function of a common carrier. In the United States this has been developed to a degree unapproached in any other quarter of the globe. By reason of density of traffic and inferiority of equipment other countries may handle passengers more cheaply than we do, but in the movement of freight which brings commodities of the most remote part of the Union within reach of all its inhabitants, the railways of the United States are without a peer on earth.

"Had the railways received as much per ton-mile in 1913 as in 1901 they would have been nearly $70,000,000 better off at the end of the year. Or if they had received the average rate of 1904, from which point they have been battered by selfish shipping interests, they would have been nearly $160,000,000 better off on June 30 last, and we would not now be waiting for a 5 per cent. raise to temper the wind to the shorn lamb."

Ton mileage for the year, according to the report, for the first time in history passes the 300 billion mark, the railways reporting a total of 2,009,462,000 tons of freight carried 300,558,334,000 miles, against 261,416,643,000 miles the year before, the previous high record. In the passenger branch of railway service another record is made, the number of passengers for the first time passing one billion, the total reaching 1,018,283,000 passengers carried 34,447,000,000 miles, which also is the largest mileage ever attained.

Yet with a total gross revenue also making a record incident to these record traffic figures, crossing the three billion dollar mark for the first time to $3,118,929,000, rising expenses offset the improvement. Operating costs rose for the first time above two billion dollars to $2,164,851,000 and left a net after taxes of $825,026,000, which, though $77,000,000 above the unfavorable year 1912, was only $1,000,000 above 1910, when $368,000,000 less business was carried on 16,000 fewer miles of track.

Total mileage of all tracks operated for June 30, 1913, is placed at 367,658 miles, the mileage of owned line being 251,500. There were 8.46 miles of line per 100 square miles of territory in the United States against 8.34 in 1912, and 387 inhabitants per mile against 382 the year previous. In relation to Europe the disparity in ratio of mileage to population is shown to be 6 to 1 in favor of the American.

Total employees numbered 1,910,000, with aggregate compensation of $1,439,000,000. There were 749 employees per 100 miles of line in 1913 against 735 officially reported in 1907, but the pay roll in 1913 was $5,673 per mile of line against only $4,711 in 1907. Average daily compensation paid per man rose from $2.44 in 1912 to $2.49 in 1913, the latter figure being an advance of 20 per cent. over 1905, when the bureau began compiling the information. This 20 per cent. meant that the railways paid $225,000,000 more for labor than would have been paid for the same number of days worked under the 1905 scale.

Letters to the Editor

SOME THINGS A PENSIONER CAN DO

New York, May 15, 1914.

To the Editor of the Railway Age Gazette:

I have read with interest the inquiry published in your issue of May 8, page 1017, signed A. W. P. under the caption, "What Can a Pensioner Do With Himself?" This inquirer is a railroad man of over forty years continuous service. He is approaching the retiring age, and asks what he can do to escape the depressing effect of no railroad office to which to go after his morning meal and no daily "Good Morning!" from his railroad friends, with whom he has exchanged greetings during these many years.

The date of my own retirement—supposing I live that long—is still some years away, but I have given the subject considerable thought. It is a serious matter. Railroad men seem to form a big secret society, and railroading more than any other business is a hard business to retire from. We never really lay the burden down while we are in the active service, and when the time comes to retire there remains a void which nothing can fill; at least, that is the way I imagine it would feel, and that is the way A. W. P. seems to feel about it.

Now, I have this suggestion to make: Our business is being regulated into the ground. We all realize that during the period of its rapid expansion certain evils grew up, although we do not admit any more responsibility for them than attaches to the shipping public, if as much; still, we know that railroad regulative laws had to come and that it is well they did come. There is, however, no excuse for the raiding of railroad revenues and hounding of railroad business, which is now being practiced all over the United States at the behest of those politicians who believe this is the popular thing to do and the way to get and retain office. Railroad men in active service are doing the best they can to defend the properties against these attacks, but oftentimes the defense suffers for mere lack of time, those who could and should make the defense being simply too busy to give it proper attention. What better field for activity could be found for the retiring contingent than to busy themselves in this matter? That is what I fully intend to do when my retirement comes, if meanwhile the government has not bankrupted the railroads and taken them; or if, contrary to our hope, the storm has not ceased before that time and quiet been restored for our much harassed business. Railroad pensioners ought to form associations all over the country for the purpose of systematically combating attacks on railroads which are unjust. We are willing that our business be purged of anything which is wrong, but there should be discrimination in the process and the retiring contingent could do much if properly organized to bring this about.

Another thing very much needed is a closer understanding among railroad employees of the different branches of the service and more loyalty to their business and to each other. The retired employees come from every branch of the service. Having been freed from the annoyances and causes of friction which complicate matters for the active staff, it occurs to me that the different branches of the retired service might do much toward bringing us all together where we could present a solid front against our critics. This, it seems to me, offers a most practical suggestion for activity on part of the old boys, which will keep up their interest, keep them in touch with the active staff and give them a field in which they can still be of service, which I have no doubt is their dearest wish. A Railway Officer.

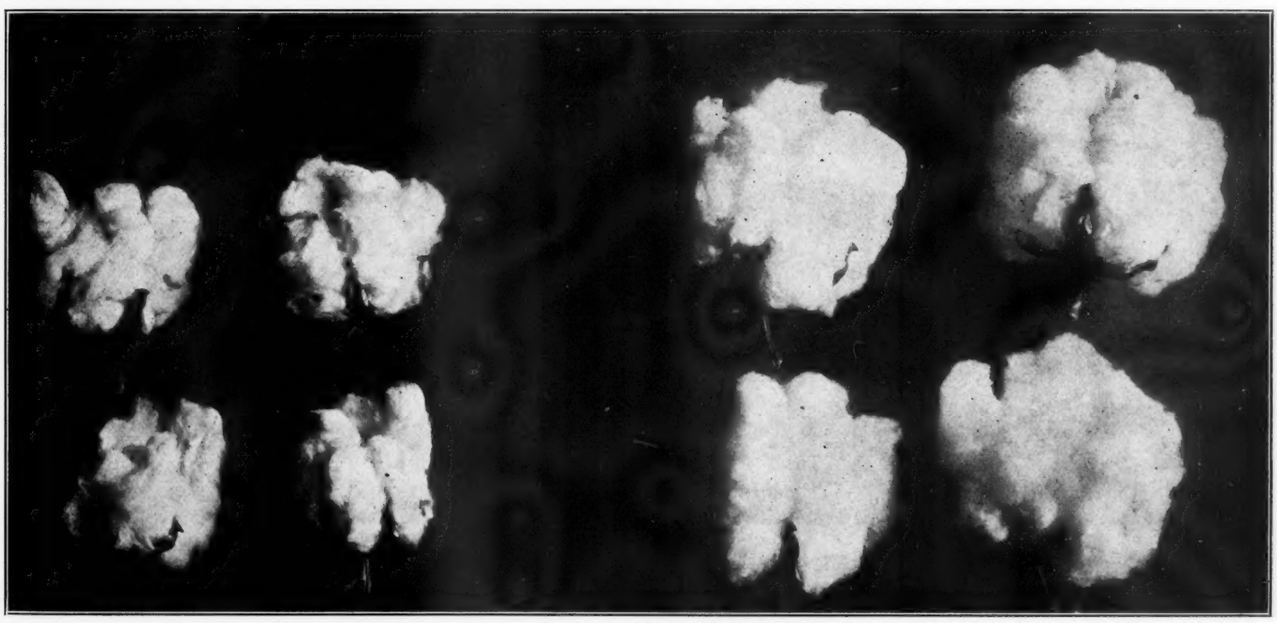
The Longest Tunnel in France.—The La Nerthe tunnel is two miles and 1,581 yd. in length and, therefore, the longest tunnel in France. It is ventilated by 22 shafts, one of which is 607 ft. deep.

Development Work on the St. Louis & San Francisco

Remarkable Results From Demonstration Farms; High Grade Settlers and Desirable Industries Located

The work of the department of development on the St. Louis & San Francisco is carried on along three general lines—the locating on the system of suitable and strong industries, the developing of agricultural pursuits, and the attracting of desirable settlers. In all three of these respects the work is being done in more or less new and unique ways, and thus far has proved most successful. The future welfare of the Frisco depends on the development of the southwestern states which it serves, and one of its most important functions is to assist in the upbuilding of this territory. So important is this work regarded that when the road went into receivership this was the only department whose expenses were not curtailed.

The industrial development work was undertaken several years ago and was in charge of an industrial commissioner. Until about a year ago, the immigration work was handled by the passenger officials. On January 1, 1913, a carefully prepared and comprehensive plan was adopted and an organization perfected with the object of creating an interest and securing actual results for the people, as well as the railroad, by the adoption of improved methods of agriculture, dairying, horticulture, marketing, etc. At the same time, the direction of all this development work was placed under a director of development.



Ordinary Seed and Cultivation. Pure Seed and Proper Cultivation.

What Has Been Accomplished in the Growing of Cotton

It is the opinion of the Frisco officials, and they are always glad to make this acknowledgment, that the remarkable progress in the way of tangible results that have been accomplished during the short time that this work has been in effect is very largely due to the interest that has been taken in it by the press, the local bankers, the business organizations of the various communities, and agricultural authorities of the several states; and by interest is meant not merely an endorsement of the plan, but actual co-operative work through the formation of associations and meetings of committees. The bankers in particular have given a great deal of time to this constructive work.

The following extract from a letter from the director of the department of development is of interest in this connection: "A great many railroads as well as the federal government and the states, have been urging agricultural development work, and like ourselves until recently have not reached the farmer to the extent of having the work actually done. The results have been deplorably lacking. We have always been convinced that if the farmers were reached, the work would be done, but we were also convinced that it was a physical impossibility for either the national government, the states or ourselves to reach all the farmers. The question then was—how to reach them. We first looked the ground over to determine what class of men were in closest touch with all the farmers, and found the local banker to be the one. No man is so intimate with the farmer as the country banker, nor is there anyone whose advice the farmer will accept so readily. Operating as he does on the banker's money, it necessarily follows that the banker will offer him no advice which is liable to lose him any money. On the other hand, it is to the direct interest of the banker to have the farmer succeed. . . . This year we have over 150 demonstration farms and orchards, in full operation in the Ozarks, in addition to the dairy associations and testing associations. The active co-operation of the local bankers, entirely independent of the American or State Bankers' Association, is something entirely new, but is the real milk in the cocoanut, and is the only way the government, the states or anybody else can successfully reach all the farmers."

LOCATING INDUSTRIES

During the year ending June 30, 1913, 328 industries were located on the Frisco, an increase of 34 over the previous year. These 328 industries employ on an average 19,627 men, who are paid wages aggregating $12,776,000 each year and who have directly dependent upon them 98,135 people. For the three years in which the industrial department has been in existence, 896 industries have been located on the Frisco system.

Industries are not usually attracted to a territory by advertising; there are good grounds for believing that such advertising, as ordinarily carried on, is practically useless. The usual course of procedure in locating an industry on the Frisco is

somewhat as follows: Observation and study on the part of the department of development may lead it to believe that a particular district is specially fitted for the location of a certain industry. Suppose, for instance, it is glass making. An expert may be retained to analyze the sand which is available for this purpose and to make a complete study of the supply and quality of all raw materials required; then follows a study of shipping routes, freight rates, possible markets, etc. If the result of the study is favorable, efforts are concentrated on getting in touch with the glass manufacturers who may be prevailed upon to locate in the district and to educate them to the advantages of the new location. If one good plant can be secured, then the other manufacturers in the same line will be more inclined to look into the conditions and possibilities. In 1912 there were two glass making plants on the Frisco; in 1913 eight more were added; and since the close of the fiscal year two other plants have been built, one of them being the largest of its kind west of the Mississippi. Today 12 of the 14 glass manufacturing plants in the state of Oklahoma are located on the Frisco. The results of the work, as it has been developed thus far, indicate that far better results may be obtained from the same expenditure of energy if the efforts are concentrated upon a particular line of manufacturing.

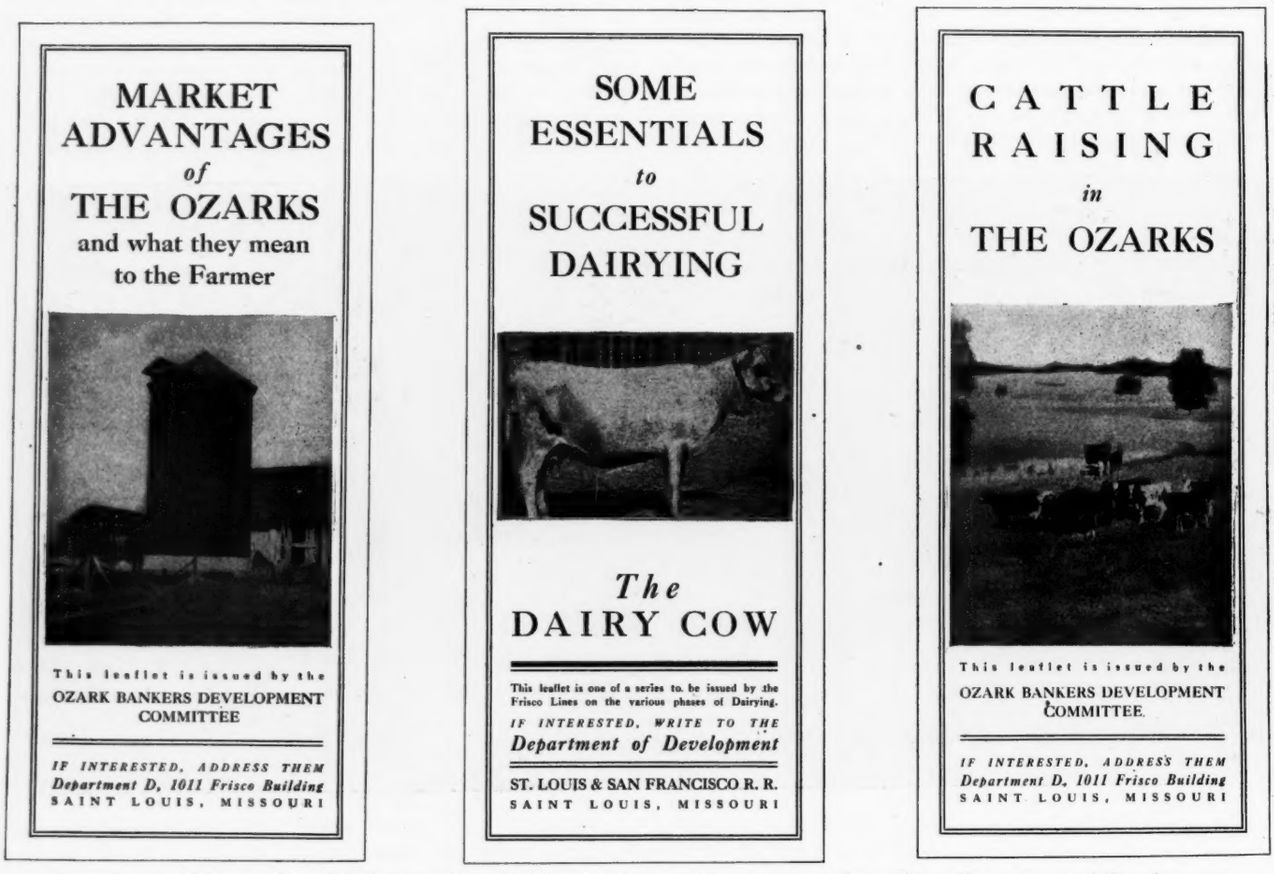
The railroad's earnings from the industries amount to only about 7 per cent. of the amount paid out by these industries in wages alone. This gives some idea of the extent to which the community is benefited. The business men appreciate the railroad's efforts to locate industries and co-operate with it, and the resultant good feeling toward the railroad is a most valuable asset.

The state railroad commissions can do much to help or hamper this work. For instance, the rates on timber to the north and east are so low as to discourage the location of factories for handling this raw material in the southwest. The commissions, by keeping down the rates on this class of material, are preventing the building of such factories in the southwest and are thus hampering its growth.

IMMIGRATION

In the matter of immigration, the attempt has not been made to secure numbers, but to get in touch with and attract the most desirable class of settlers. During the year ending June 30, 1913, 3,633 families were located, with a total acreage of 466,169. For the six months' period following, an area equal to half that of the state of Rhode Island was taken up by farmers. Records show that 2,934 farmers were located along the Frisco, bringing with them 1,997 cars of farm equipment and purchasing 333,765 acres of land. In order to reach the very best grade of possible settlers, the railroad has developed a large list of responsible, land-owning, tax-paying farmers in various parts of the country and periodically sends to them attractive literature calling attention to the advantages of various parts of the territory which the road serves. It has been observed that very many of the settlers who were attracted by the opening of free lands and the great amount of advertising which accompanied it were not of the substantial and hard working class which is so necessary in building up and developing a new country. In most cases such people are an actual detriment and no attempt is now being made to attract them.

A blank form is enclosed with the pamphlets which are sent to the prospective settlers, and if this is filled in properly and returned to the railroad it is referred to one of the local banks in the district in which the farmer desires to locate. An accurate record is kept of all such inquiries and the banks to which they are referred, and if prompt attention is not given to them by any one of the bankers, future inquiries are sent elsewhere. It may be said, however, that the very best of co-operation is being received from the bankers generally. This is


MARKET ADVANTAGES of THE OZARKS and what they mean to the Farmer
This leaflet is issued by the OZARK BANKERS DEVELOPMENT COMMITTEE
IF INTERESTED, ADDRESS THEM Department D, 1011 Frisco Building SAINT LOUIS, MISSOURI
SOME ESSENTIALS to SUCCESSFUL DAIRYING
The DAIRY COW
This leaflet is one of a series to be issued by the Frisco Lines on the various phases of Dairying.
IF INTERESTED, WRITE TO THE Department of Development
ST. LOUIS & SAN FRANCISCO R. R.
SAINT LOUIS, MISSOURI
CATTLE RAISING in THE OZARKS
This leaflet is issued by the OZARK BANKERS DEVELOPMENT COMMITTEE
IF INTERESTED, ADDRESS THEM Department D, 1011 Frisco Building SAINT LOUIS, MISSOURI

Cover Pages of Some of the Publications Sent Out by the Bankers Committees and the Frisco Department of Development

evidenced by the formation within the past year of two bankers' development committees, one in Oklahoma and one in the Ozarks. Bankers in other communities on the system will undoubtedly follow the practice as its advantages become more generally known.

Some idea of the work which is being done by these bankers' development committees may be gained from the following extract from the resolutions of the Ozark Bankers' Development Committee, which includes 125 banks with 1,200 officers on its membership list:

Whereas, The section of Missouri known as the Ozarks comprises almost one-half the area of the state, and has a greater diversity of agricultural possibilities and resources to offer than any other section of the central or western states; and,

Whereas, The bankers of the Ozarks are interested in having the people of the country at large know of these vast possibilities, varied resources, and the wide range of opportunities available to the man who wants to farm for profit, but to make these facts known necessitates an organization which shall conduct its work along conservative lines for substantial development, rather than follow obsolete "boom" methods heretofore employed in many sections, which have resulted only in riotous speculation and failure; and,

Whereas, The bankers of the Ozarks realize the possibilities yet undeveloped by the farmers already in the Ozarks, and know that the development of the Ozarks is dependent not alone upon the location of the new farmer, but upon his success when he is located; and,

Whereas, The Frisco Railroad through its Department of Development has tendered its services to the bankers of the Ozarks in formulating and carrying to a conclusion such plans and work as will result in the development of the Ozarks, and knowing it is only by co-operative methods and persistent work that results can be accomplished; therefore, be it

Resolved, That this body of Ozark bankers enter into a permanent organization to be known as the Ozark Bankers Development Committee, and that the work of this committee shall be:

(1ST)—IMMIGRATION

To place before the country in a business-like way the advantages and the opportunities which the Ozarks possess, and are offering to the business-like farmers of the country.

(2ND)—IMPROVING METHODS OF AGRICULTURE

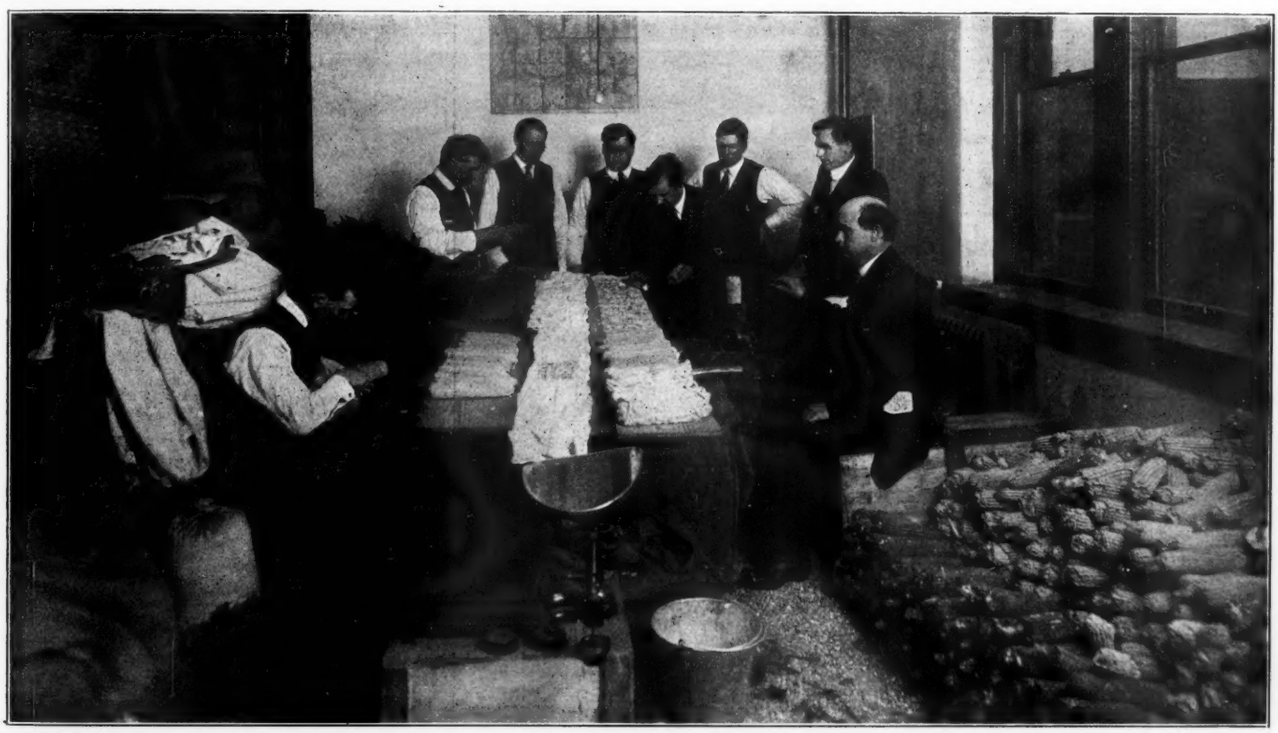
To work in co-operation with the farmers of our respective communities, and the Department of Development of the Frisco and its agricultural representatives, in bringing about the most advanced and improved methods of agriculture throughout the Ozarks. One of our foremost objects being to have every farmer now in the Ozarks, and those that may hereafter come, succeed on the farms.

(3RD)—MARKETING OF FARM PRODUCTS

To co-operate with the farmers of the Ozarks and the Marketing Bureau of the Frisco Railroad in every manner that will result in securing for the producers of the Ozarks the maximum prices for their products. This will mean immediate assistance to the live stock men, fruit growers, poultry raisers, dairy farmers, etc.; and, be it further

Resolved, That in addition to the selection of a president, vice-president, secretary and treasurer, an executive board—to be composed of nine members—and a bureau of publicity and immigration, a bureau of live stock, a bureau of agriculture, a bureau of marketing and a bureau of dairying—to be composed of seven members each—be selected to immediately carry out the details of this work.

The work of these associations will be referred to further in connection with the agricultural part of the development work. Suffice to say here that they are securing many new and desirable settlers, and these people are coming into the community at the invitation of the bankers and, to a certain extent, with their backing. The newcomer does not first get in touch with the over-enthusiastic real estate agent who wants to sell him land, but with the substantial citizen who is anxious to see the community developed along the soundest lines.



Seed Testing Room of the Frisco at Springfield, Mo.

One of the most interesting records kept by the department of development is that of the immigration outfits which move into and out of the Frisco territory from month to month. It is assumed that the desirable settler is one who comes to the territory with the intention of locating permanently and with a certain amount of household goods. The agents on the system are, of course, informed as to all such parties and a record is made of where they come from, where they locate, and the amount of acreage which they take up; a similar record is also kept of those leaving the territory. Each banker is furnished with copies of the statistics referring to the district in which he is located and is thus kept closely informed as to the development of the community. The new settlers are placed on the mailing list of the agricultural department and are furnished with any data which may be of value to them. Moreover, they are encouraged to ask for information or assistance.

It is pretty safe to assume that people who settle in a new territory under these conditions are going to get the best results and will make valuable additions to the community. These statistics of settlers moving in and leaving the territory will

doubtless develop some interesting facts as to the best methods of handling the immigration problem. For instance, experts from two roads in other parts of the country have spent a considerable amount of time on the Frisco giving illustrated lectures to the farmers and otherwise trying to show the advantages of moving into the new countries which they serve. In spite of the large expense to which they have gone, statistics do not show that any of the farmers on the Frisco have left for these particular districts.

AGRICULTURAL DEPARTMENT

While the agricultural department was only established in January, 1913, and therefore had very little time to prepare for the work of that year, it has demonstrated that the production from lands already under cultivation may be increased at least 75 per cent. by the use of better methods. This was proved by 93 demonstration farms in Missouri and Oklahoma. These demonstration farms are very different from the ordinary conception conveyed by that term. A certain number of farmers—44 in Missouri and 49 in Oklahoma—were persuaded to set aside from five to ten acres and farm it under the direction of a Frisco demonstrator. The farms selected were located on the poorest as well as on the best soils and were selected so as to be convenient for inspection by as many of the other farmers in the district as possible. The results which were obtained are all the more remarkable when it is recalled that the past year was one of the driest which was ever known in the states where these farms were conducted.

Two things are very largely responsible for the remarkable results which were obtained—the use of pure seed and proper cultivation. It was demonstrated conclusively that the net income from the cotton crop could be doubled in Oklahoma. Demonstrations on 25 farms containing 116 acres showed an average yield of seed cotton of 695 lb. to the acre, while similar land planted with ordinary seed and cultivation produced only 378 lb. Cotton raised on the demonstration farms gave 36 per cent. lint, while ordinary cotton produced only about 30 per cent. Had all of the cotton farms of the state done as well as the demonstration farms, Oklahoma would have produced 600,000 more bales of cotton than it did.

The average yield of corn from demonstration farms in Oklahoma was 23.8 bus., as compared to 11.9 bus. on similar land under ordinary cultivation, or as compared to 11 bus. per acre, the average yield for the state as given by the records of the United States Department of Agriculture. In Okmulgee, where the corn was grown in 6 ft. rows with cowpeas seeded between, the average yield was 28 bus. per acre, as compared to 5 bus. per acre, the average yield for the county as shown in the records of the state board of agriculture.

One of the most important developments of the work has been the stimulation toward the introduction of drought resisting crops in western Oklahoma, where the rain fall is uncertain and insufficient to produce a corn crop with the best of cultivation. In this district the average yield of corn on the uplands for the past 20 years has not been sufficient to pay for cultivating and harvesting the crop. In spite of this the farmers have been planting millions of acres of it each year. The failure of this crop has meant that the farmers have been forced to sell their stock, a most unfortunate happening for the welfare of the district. The Frisco introduced peanuts on 15 of the demonstration farms, one acre, as a rule, constituting the demonstration. On 11 of the farms the average yield was 51.5 bus. per acre, and from one to two tons of hay were produced per acre. On the other four farms the nuts were not harvested separately, but the hay alone more than paid for the cost of production. The hay sold at about $20 per ton, and the nuts brought from 60 cents to $1.50 a bushel. The cowpeas have also been experimented with and gave a most profitable yield of hay on all of the demonstration farms; this is also a splendid soil improver. Kafir corn and milo are also being introduced with good results.

The corn demonstration farms in southwest Missouri, where the drought was exceedingly severe, gave an average return of 27.2 bus. per acre on 19 farms, with 129.5 acres under cultivation. The yield from similar land where the ordinary methods were used was 12.9 bus., and the average yield for the section, as shown by the records of the state board of agriculture, was only 10.2 bus. In eastern Missouri on 21 farms, with 84½ acres under cultivation, the average yield of corn was 33.2 bus.

Interior View of the St. Louis & San Francisco Dairy Car

per acre. The average yield for similar land under ordinary cultivation was 17.6 bus. per acre.

Ninety per cent. of the farmers have not given the conservation of moisture any serious consideration. The average rain fall in most of the territory served by the Frisco is sufficient to produce crops if the proper methods are used, and the education of the farmers as to these methods and the preparation of the soil is a most important part of the work of the agricultural branch of the department of development. Of equal importance with thorough cultivation is the use of proper seed. All of the seed used on the demonstration farms was selected and tested by the development department. For the present year the bankers' associations have co-operated with the railroad in seeing that only the best seed is provided and used. As far as possible the demonstration farms will be made the headquarters for local seed distribution, thus proving a source of profit to the farmer who co-operates with the railroad. One of these farmers at Okmulgee, Okla., this year sold his entire corn crop for seed at $1.50 a bushel delivered on his farm. It is probable that from 30 to 40 per cent. of the demonstration farms will become seed breeding farms.

Close attention will be given to the proper harvesting of the seed in the field. At the beginning of the harvest season all of the agricultural demonstrators will devote their entire time to demonstrating with each of the farmers the proper method of harvesting for planting purposes. At a meeting held in Springfield, Mo., March 18-19, the Ozark Bankers' Development Committee passed the following resolution:

Resolved, That during the coming season two meetings of farmers be held at each point where demonstration farms are conducted, the first meeting to be at the time cultivation ordinarily ceases. The purpose of this meeting is to call special attention to the demonstration farms and their methods, and to encourage the farmers to continue their cultivation for the preservation of moisture.

The second meeting to be known as "Better Seed" meeting, to be held at the beginning of harvest time; the Department of Development of the Frisco to prepare itineraries covering both series of meetings, each member of this committee to co-operate with the Frisco in thoroughly advertising each of them.

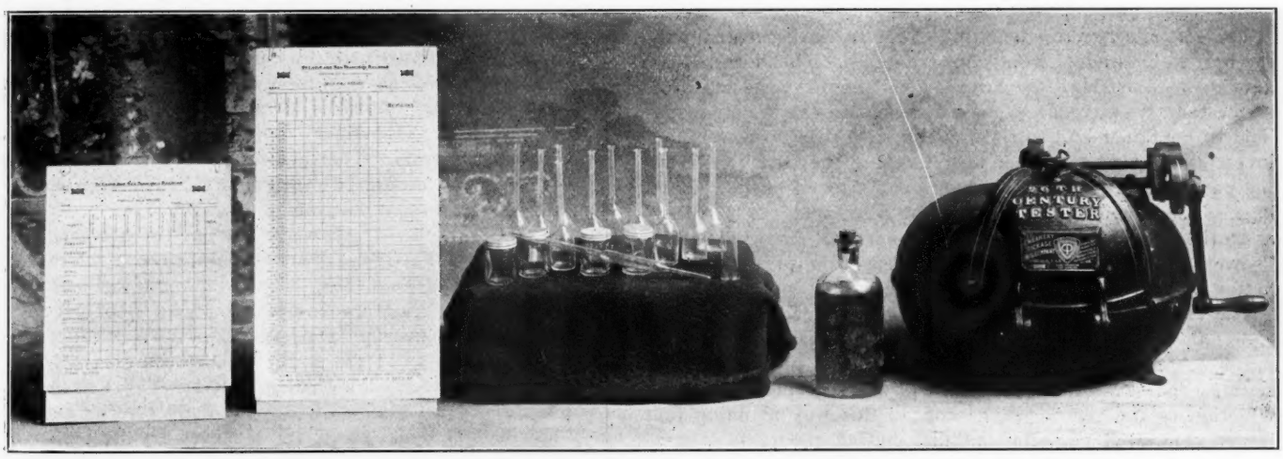
The Frisco not only tests all the seed which it supplies, but will test the seed for any of the farmers along its lines. It is surprising to find the amount of seed offered to farmers which has no germination properties whatever, and bushel after bushel has been discarded at the seed testing rooms at Springfield.

Many of the farmers insist on planting the same kind of crops and following the same methods which they did in the country from which they came, regardless of the adaptation of the district for such crops. Much educational work will have to be done to break this practice up, although it is believed that the remarkable results obtained from the demonstration farms last year will go a long way to do so. The same thing is true as to crop rotation, the average farmer having a very poor understanding of the principles of building up the soil.

The problem in Alabama and Mississippi along the line from Memphis to Birmingham is to get the farmers to abandon the one crop system. Cotton is now grown in this section almost universally and it is necessary for the farmer to buy practically everything required by his family and the farm. This is probably largely because he can borrow money in advance on his cotton crop, it being not unusual to have two-thirds of the crop mortgaged before or shortly after it is planted. By diversifying the crop the farmer can raise a considerable amount of the food required by his family and cattle and at the same time can improve the condition of the soil.

During the present year the number of demonstration farms has been increased from 93 to over 400. Last year thousands of farmers visited the demonstration farms and were impressed by the results which were obtained. This year it is expected that in addition to the demonstration farms many of these visitors will apply the knowledge which they gained in visiting the farms last year and will make an effort to keep in touch with the practices on these farms this year. This should result in a notable increase of production in the Frisco territory.

One fact which was clearly demonstrated last year was that the average farmer tries to keep more land under cultivation than he can attend to, and the yield per acre falls off to so great an extent that it would have been far better for him to cultivate a smaller area more thoroughly. This tendency to "over-cropping," as it is called, is one of the problems which the department of development must meet and use its influence to overcome.



Milk Testing Outfit Used on the Dairy Car and Milk Record Forms Furnished by the Frisco

FRUIT RAISING AND MARKETING

Certain parts of the Ozark district are specially well adapted for fruit raising, but other sections are not so well fitted for it. Unfortunately the district generally has been over-advertised in this respect and this, coupled with the lack of proper care and intelligent interest on the part of many of the growers, has resulted in anything but a healthy condition as to fruit raising in some of the districts.

When fruit growing was first started in the Ozarks there were none of the injurious insects and diseases which were so well known in the older fruit raising districts. As the extent of the fruit growing territory increased, these pests were gradually introduced, but, except in a few cases, no effective effort was made to drive them out. The result may be imagined and the horticultural branch of the department of development has a big job ahead of it. Thus far its energies have been concentrated on encouraging the complete destruc-

tion of orchards which have become so diseased that their renovation could not be profitably and promptly brought about. The planting of orchards in sections which are not specially adapted to them is also being discouraged. The department has made numerous studies and investigations as to the adaptability of the various sections for different products and is in a position to recommend the varieties which may be grown to best advantage in each district.

A large proportion of the orchards have received little or no cultivation in the past. Summer cultivation and winter cover crops are being encouraged in an effort to rebuild the soil and prevent erosion. Spraying and pruning demonstrations have been conducted and special attention has been given to the eradication of certain diseases and insects which have proved particularly injurious. This work will be extended during the coming season.

Possibly the most important demonstration in the horticultural department has been the remarkable results which were obtained by an attempt to improve the conditions of marketing the crop. It became apparent almost immediately after the organization of the department of development that the greatest source of loss to the farmers and therefore to the railroad was the inability to market the crops. In 1912 4,000 cars of apples were not harvested because of this deficiency. More than this, the growers knew practically nothing as to the grading and packing of their products. This resulted not only in damage in transit, but in an unprofitable price for the goods when they reached the market.

The strawberry crop being the first to be harvested was the first to be studied from this standpoint. The railroad, by getting in touch with the buyers at all of the large markets in the country, was able to make a report on the best size and kind of container and to recommend it to the growers. The investigation also developed an interest in the Ozark crop on the part of the produce merchants and opened up new markets. The horticultural department also made suggestions as to the picking and grading of the berries. As a result the growers were able to dispose of their crop to very much better advantage than in previous year.

The experience with the strawberry crop made it possible to handle the peach crop to even better advantage. The first move was to get practically all of the peach growers into a selling organization and thus control the movement and distribution of the Ozark peach crop, in this way avoiding the larger congested markets and distributing the crop over a wider territory without gluttering any of the markets. Shortly before the shipping season opened an educational campaign was carried on to instruct the growers as to the proper grading and packing of the crop. When the crop started to move, packing sheds with tables were established at the stations and the energies of the operating department of the railroad were concentrated upon seeing that a sufficient number of cars properly iced were provided and that they were moved promptly when loaded. The necessity of moving the entire peach crop within a period of three weeks requires splendid team work on the part of the railroad organization throughout, and this year it was done with practically no claims for loss or damage. This effort is appreciated on the part of the growers and they are encouraged to take even a greater interest in the preparation of their crops for the market.

Of course, the results in handling the peach crop became generally known to the apple growers and they began to understand the importance of grading and proper packing well in advance of the time that their crop was ready for the market. Just as soon as the peach crop had been moved, grading and packing schools were arranged for in the apple section and these were continued for a period of about six weeks until the entire section had been thoroughly covered.

One effect of the study of marketing conditions was the proof that the greater proportion of the various products of the farms on the Frisco could be marketed in the territory covered by it, and here the agency plan, which was described in the *Railway Age Gazette* of March 20, 1914, demonstrated its value in no uncertain terms.

THE DAIRY DEPARTMENT

Natural conditions in the Frisco territory, particularly in the Ozarks and certain parts of Oklahoma, are most favorable to the dairy industry if certain fundamental factors can be corrected. For instance, in the Ozarks so much attention has been given to horticulture that the necessity of providing pasturage and forage crops has been largely overlooked. With a reasonable amount of intelligent effort this handicap can be overcome and good grain crops can be grown on the valley lands in sufficient quantity to feed all the stock that may be produced for many years to come. The department of development, with the co-operation of the Ozark bankers' committee, is trying to point out the way to better conditions in this respect.

The average farmer has given little, if any, attention to the breed of his dairy stock and has had no check on the output of individual cows. One of the most important phases of the work of the dairy department has been to demonstrate how the milk may be tested for butter fat and to encourage the farmers to keep individual daily records of returns from each cow. A dairy car has been fitted up, as shown in one of the illustrations, and has been kept busy covering the dairy districts in the Ozarks and Oklahoma. Lectures are given in this car and demonstrations are made as to how the milk should be tested and how the cattle should be fed and cared for, but the actual lecture work is more or less incidental and its value is largely in attracting the attention of dairy farmers. The effective part of the work may be illustrated by the happenings in the Ozark district. With the co-operation of the bankers' committee, every dairy cow in that district has been tested and inventoried. The farmers have been shown that many of the cows "do not pay their board." The unprofitable cows are sold to the butcher, and this weeding out process is almost immediately reflected in the increase of net earnings.

What follows? The farmers are inspired to give the matter more attention and both the railroad and the bankers' organizations stand ready to co-operate. The Babcock milk testers are inexpensive and the large dairy farmer can easily afford to invest in one; the small farmers can join together and have one or more community testers. The Frisco furnishes the cards or forms on which the daily returns may be made for the individual cows, and if necessary its staff will perform the necessary computations to show just how profitable or unprofitable the various cows are. Its experts are also glad to supply data and information as to the proper feeding of the herd, as to what grasses or grains may be raised to the best advantage for feed in each district and as to the treatment of diseases.

Then, too, the vital point of improving the breed must receive careful attention. The department is at all times ready to advise as to the merit of the different breeds. The bankers' committees, which arrange for monthly "get together" meetings to discuss the dairy problem, can exert considerable influence toward getting the farmers to co-operate in the purchase of good bulls, particularly when they understand the remarkable financial returns which follow an investment of this kind in developing the best breed of dairy cows. In many cases the bankers are willing to finance the purchase of community bulls, and the department of development and the bankers see to it that no good stock of this kind is allowed to leave the district.

One vital factor in the work of the dairy department must not be overlooked. It does not recommend a lot of expensive devices or equipment, but aims to inspire the dairy farmers to make the best use of such equipment as they may have at hand.

The marketing of dairy products has not been lost sight of and the department of development is ready to use its influence to locate creamery facilities as fast as the producers

demand them. Here, too, the co-operation of the bankers is a most important factor.

ORGANIZATION OF DEVELOPMENT DEPARTMENT

The department of development has been organized and is headed by Frank Anderson, director of development. On his staff is a supervisor of agriculture, W. L. English; a superintendent of demonstration work, I. O. Schaub, with seven farm demonstrators; a dairy agent, A. J. McDowell; a horticultural agent, A. P. Boles; a supervisor of farm marketing, E. C. Hoag; a general immigration agent, S. A. Hughes, and an immigration agent, and two industrial agents.

Where did the farm demonstrators come from? Why can they do so much more effective work than the government experts or those who are connected with the agricultural colleges?

In reply to the first question, the experts were almost all taken from the government service. It has been a most difficult problem to find the right kind of men and enough of them, and great care has been taken in their selection.

In answer to the second question, it must be remembered that the government experts, federal or local, have given much time and attention to awakening the farmers of the great Southwest to the possibilities which lie before them. Unfortunately their work has been largely in the nature of lectures which interested the farmers; this interest, however, producing very little in the way of productive results. It remained, then, for some agency to actually step in and demonstrate the value of these teachings. The Frisco methods supply this need and it is just this feature which has been productive of such splendid results.

Why do not the government bulletins, the farm journals and agencies of this kind appeal more strongly to the average farmer? This is a most difficult problem to answer. Probably because they cover general conditions and are not written exactly to fit local conditions; possibly also because the average farmer is not much of a student. He has not yet come to the state where he regards his work as a profession which deserves the same study and thought that other professions do. At any rate, in spite of all such agencies, it remained for the Frisco to demonstrate and show the farmer how to get results.

The Frisco demonstrators do not supervise the work with written instructions. They visit the farms frequently and the instructions are verbal. As has been noted, the great difficulty has been to obtain a sufficient number of demonstrators. At present there are probably five times as many requests for the services of these men as can be filled. It is quite probable that when the present season has been ended some of the farmers who have had demonstration farms for two years may be retained to carry the work on among their immediate neighbors.

When the department of development was first started the newspapers were not greatly interested. As they watched its progress, and particularly when the bankers offered their co-operation, this attitude changed to one of active interest. Now practically all of the newspapers on the Frisco publish articles and notes concerning the work at regular intervals, and the difficulty is not to get them to use the copy, but rather to fill their demands for it.

The invitation to the farmer to bring his problems to the department for help in their solution has developed a very heavy correspondence, and a force of about ten clerks is retained at the headquarters in St. Louis to conduct this correspondence with the 15,000 or more farmers who have come in touch with it.

MOTOR TRANSPORTATION ACROSS THE ANDES.—It is reported that a scheme is under consideration for the establishment of an automobile transport service across the Andes to compete with the Trans-Andean Railway.

STATISTICS OF BLOCK AND INTERLOCKING SIGNALS

The Interstate Commerce Commission has issued its annual statement, as of January 1, 1914, showing the mileage of railroad in the United States on which the block system is in use; and, in addition to the data heretofore given, there are included two tables of statistics of interlocking plants containing information of a kind never before gathered by the government. These two tables, by the way, include a number of roads which do not appear in the block signal tables.

The total length of road block signaled, 86,737 miles, is not very much larger than the length reported a year ago; but the increase in length of road equipped with automatic block signals, 4,350 miles, is more than twice as much as the increase shown in the last preceding year. In the last five years the automatic block signal mileage of the country has more than doubled. The principal totals of the present report are as follows:

Length of Railroad in the United States on Which the Block System Is in Use

Miles road—	Jan. 1, 1914	Jan. 1, 1913	Jan. 1, 1909
Automatic	26,569.3	22,218.8	12,190.6
Manual	60,167.6	61,731.0	47,358.1
Total	86,736.9	83,949.8	59,548.7
Changes—			
Automatic	I. 4,350.5*	I. 10,028.2†	.....
Manual	D. 1,563.4*	I. 14,372.9†	.....
Both kinds	I. 2,787.1*	I. 24,401.1†	.....

* Increase or decrease compared with 1913.
† Compared with 1909.

The list of roads reporting interlocking plants contains about 240 names, of which 40 have more than 1,000 working levers each, and 13 have more than 3,000 levers each. No totals are given in this table, for the reason that there are many duplications, the same plants being reported in some cases by two or more roads.

The use of telephones in the transmission of train orders is now in vogue on 77,292 miles of road or 9,195 miles more than was reported one year previously. The twelve-month increase in this mileage was about the same as in 1912.

Further data from this report will be given in a future issue of the *Railway Age Gazette*. Copies of the full report may be procured from the Superintendent of Documents, Government Printing Office, Washington, at ten cents each.

THE LONGEST RAILWAY TUNNEL IN ASIA.—The Khojak tunnel in Beluchistan, with a length of two miles and 769 yd., is the longest railway tunnel in Asia. It is on the Chaman extension of the Sind-Pishin section of the North Western Railway of India. This extension was built between the years 1888 and 1891 in consequence of the fear of Russian aggression. The tunnel pierces an historic pass across the Khwaja Arman offshoot of the Koba-Kakar Mountains. Two lines of the Indian 5 ft. 6 in. gage are laid through the tunnel which is, like most of the tunnels on the northwest frontier of India, guarded at each end by strong iron gates.

THE ST. PETERSBURG CIRCULAR RAILWAY.—Among the many proposals in connection with Russian railways, the new interterminal line at St. Petersburg is of particular interest. This line will form a circular railway connecting up the various lines entering the city and, besides being available for the carriage of merchandise and passengers from one system to another, will serve the new port as well as a number of factories in the St. Petersburg suburbs and thus facilitate transport. It should also attract a heavy local passenger traffic. The line will be about 63 miles long. No decision has yet been come to with regard to the equipment of the line, but there is some talk of its being operated electrically from the first, as it will eventually have to be made an electric railway, owing to traffic considerations. The chief obstacle to electric operation is the complications at its junctions with the other railway systems.

Louis D. Brandeis on Railway Operating Efficiency

Freight Transportation Efficient, but Passenger, Mail and Expedited Freight Service Unremunerative

On April 30 and May 1 Louis D. Brandeis, special counsel for the Interstate Commerce Commission, made an oral argument before the commission at Washington based on the brief he had submitted in the rate advance case. An abstract of Mr. Brandeis' brief was published in the *Railway Age Gazette* of May 8, page 1023. Following are some condensed abstracts from the oral argument dealing particularly with the subject of operating efficiency, and the relative remunerativeness of the freight and passenger service, which are of especial interest in view of the statements regarding railway inefficiency made by Mr. Brandeis in the previous rate advance case:

REVENUES INADEQUATE

It may be helpful if at the outset I state the conclusions which a review of these cases has brought to me. They are these:

First, that on the whole, the net income, the net operating revenues of the carriers in Official Classification territory are smaller than is consistent with their assured prosperity and the welfare of the community, and that this is notably true of the Central Freight Association lines, and it is true practically as to other lines, also, because of the C. F. A. scale. In view of this, it is desirable that steps should be taken as promptly as reasonably may be to increase those net revenues.

Secondly, that the method proposed by the carriers for increasing these net revenues is essentially unsound; that it is, except as to a small part of the tariffs that have been submitted, entirely too low, and would, if approved, involve the exceeding of the powers vested by Congress in this commission; and as to that small part of the tariffs as to which it would be legal to approve them, it would be extremely unwise both for the carriers and for the community to grant that approval.

Third, that there is nothing in the condition of the carriers which should prevent the adoption of those methods of increasing their revenues which are conformable to and in accordance with their interests and that of the community, and that there exist, as has been indicated on this record, adequate means of increasing those revenues without resort to the unsound, largely illegal and undesirable method of the alleged horizontal increase.

What is the explanation of this remarkable fact that in other businesses, subject alike with the railroads to increase in wages and governmental regulation, increase in taxes and increase in cost of money, and increased supplies and increased cost of coal, there is blooming health, and with the railroads there is said to be a condition of morbidity? Two possible causes will suggest themselves. It may be that the railroads have succeeded less well than all these other businesses in increasing their productivity; or it may be that the thing which the railroad is giving to its customers, called by the same name, is not the same thing which they gave before.

EFFICIENCY IN FREIGHT TRANSPORTATION

Let us see whether the railroads have progressed in productivity. Look at what they have done; look at what Mr. Willard has done in that respect since the advance rate case of 1910. The Baltimore & Ohio ton miles have increased 18.6 per cent., and train miles have increased 15 per cent. That means that the train load has increased 40 per cent. Is not that a remarkable advance in efficiency in these three years? Does it not show, as it involved necessarily the expenditure of considerable capital, that the capital of the Baltimore & Ohio, which was expended under Mr. Willard's direction in effecting that result, was well expended; that it has earned not merely interest, presumably, but far more than the interest on the money which was borrowed for that purpose? But Mr. Willard's achievements are not limited. We know that the cost of coal to the Baltimore & Ohio and the cost per ton has increased, but owing to the efficient management the consumption of coal per mile or per 100-mile hauls has decreased; it has decreased so much as to overcome the increased price in the coal, the improvement being some 9 per cent. There you have a definite and clearly demonstrable advance in efficiency, as clear a result of what efficiency can do as could be presented anywhere.

Now, what would you expect from that result? You ought to expect that the operating costs would have been diminished and not increased, because that increase in train loading is more than comparable to the 9 per cent. increase in wages; and yet we find, upon examining the operating ratios of these two years, that instead of a decrease, which you might have assumed from that remarkable advance in productivity, you have an operating ratio of 70.8 in 1910 as against 73.84 in 1913, a difference of nearly four points. Some small part of that may be attributable to the reduction in rate, but only a small part.

But you are investigating this cause and are called upon to look to see what is the cause. When you turn from Mr. Willard's account and look at what other railroads have done; when you look over the long sheet of returns and exhibits from the other railroads in Official Classification territory, the impression must come to you that what Mr. Willard has experienced in increase is the common experience of railroads; that that which leads the carriers to tell you about increased wages and increased taxes and increased legislative burdens is an increase in common. But you say to yourselves: Is not there among those lines—35 or more railroads—are not there some that did not have this experience? If we could find some railroads whose operating expenses did not increase we might then hope to get some line on what may have been the cause, the special cause, as to why this great increase in efficiency in train movements has not produced the results you would expect.

FREIGHT ROADS SHOW DECREASING OPERATING RATIO

You find that there are two railroads, small ones relatively, which show, instead of an increase in operating ratio, a decrease. The Kanawha & Michigan shows an improvement; that is, a decrease in operating ratio from 69.82 in 1910 to 66.17 in 1913. By virtue of that it is enabled to increase its net income applicable to dividends from 6.30 in 1910 to 11.17 in 1913. There is a railroad far up in New England, the Central New England. In 1910 its operating ratio was 57.34, and in 1913 it was 52.99; and by virtue of that improvement the Central New England had applicable to dividends in 1910 only 4.47 per cent., and in 1913 8.45 per cent. What was the cause? It wasn't a matter of locality; it wasn't a matter of similarity of traffic, because the Kanawha & Michigan is a coal road and the Central New England is a road devoted to merchandise traffic. It is not a fact that it is due to different management because the Central New England is a part of the New Haven system, and at the same time that the Central New England has reduced its operating ratio in the way that I have pointed out, its parent company, the New Haven, which surrounds it, and with which it is operated almost as a unit, has increased its operating ratio from 62.95 to 68.63, an increase of 5.5 points.

When we look into the Kanawha & Michigan and when we look into the Central New England we find this situation: That both of these railroads, handling as they do the most diverse traffic, having very different average rates for transportation, and having different kinds of traffic, have this in common: neither of them has any appreciable passenger traffic. Each of them has but a trifle over 13 per cent. of passenger train revenue, and all the rest is from freight. The New Haven, with its high operating ratio, as against 13 or 14 per cent., has 50 per cent., or a trifle over one-half of all of its revenue from

passenger service. The Baltimore & Ohio has a very appreciable proportion, far above that of these other roads. Perhaps that may be an explanation. Is it the passenger traffic which makes the difference? And that leads us, therefore, to endeavor to ascertain whether, in any other branch of the service we find these ton miles and this increase in train mileage, which has been so marked under Mr. Willard's management. Possibly another great department of the Baltimore & Ohio's service is subject to conditions far more adverse, and our natural tendency therefore is to look into the accounts and to see what the passenger service costs.

PASSENGER OPERATING RATIO INCREASES—BALTIMORE & OHIO.

The science of railroad cost accounting is almost in a rudimentary state; but Mr. Willard, an experienced and efficient railroad manager, when he came upon the Baltimore & Ohio Railroad in 1910, recognized that an attempt must be made at once to separate passenger service from the freight service, so far as cost accounting was concerned. And we have, beginning in January, 1910, an attempt to allocate expenses between passenger and freight. Considerable success has been attained, an allocation specific of 70 per cent. of the total, leaving only 30 per cent. to be apportioned. Take these figures, subject to all of the criticism, which we know they must be subject to, owing to the lack of perfection in that branch of railroad science, and what do we find? We find, taking the figures for the first full fiscal year which we have, the year ending June 30, 1911, and comparing them with the figures for June 30, 1913, exactly what we would have expected in respect to the freight traffic under Mr. Willard's efficient administration, because the freight ratio of operating expenses has been reduced in that two-year period from 68.16 per cent. to 66.44 per cent., or nearly 2 points.

At the same time, what do we find in regard to the passenger traffic? We find that the passenger cost in those two years, according to those figures, has increased from 82.39 per cent. to 106.23, showing, according to those accounts, that the passenger traffic in the year ending June 30, 1913, absolutely cost the Baltimore & Ohio Railroad 6 points above—that is 6 per cent.—without taking into account capital charges. Applying that upon the total passenger revenue we make an increased operating expense for the passenger train service of over $4,000,000, more, as a matter of fact, than the total amount that the 5 per cent. advance upon all the freight rates would amount to, taking the year 1913 as your base.

PENNSYLVANIA

On the Pennsylvania system it is not a new thing to separate the accounts. They have been doing it for just half a century. Every year the Pennsylvania Railroad has given to its stockholders a statement showing the separation of freight and passenger earnings and expenses. It shows exactly the same trend which you find on the Baltimore & Ohio. The figures are somewhat different; the spread is somewhat different; and it may be because of difference in the efficiency of management. But what do we find? We find that in 1907 the operating ratio of the Pennsylvania for freight was 71.6 per cent. In 1913 its operating ratio was 73.4 per cent. There is a difference of 2.2 per cent. In these six years you have had no doubt 10 or more per cent. increase in wages; you have had increase in taxes and you have had these increases in legislative burdens; but the efficiency of the Pennsylvania management, dealing with its freight, has enabled it to keep down these operating expenses to 2.2 per cent., and keep them down there in spite of that liberal charge of maintenance and equipment and maintenance of way of which Mr. Lyon and Mr. Thorne have spoken. In 1907 the passenger ratio was 74.4. It differed there very little from the freight, which was then 71.6. In 1913 it had grown to 92.6, an increase in those six years of 18.2 per cent., whereas the freight ratio had risen 2.2 per cent.

How does this affect these operating results? You have this: for 1907 to 1913 the operating passenger revenues of the Pennsylvania increased from 31 to 38 millions. What became of their net earnings from passenger operations? While the revenues themselves increased seven millions the expenses increased so much that the net earnings decreased from over eight millions to $2,800,000. You had in that period, from the passenger service itself, a difference of nearly six million dollars, between five and six million dollars' loss by the increased operating expenses.

The freight revenues increased about twelve million dollars. A large part of that increase was loss, but you come out in the end with a million dollars more freight earnings than you had at the beginning. But you were dealing with very much larger sums. You are dealing with 135 millions of freight earnings as against only 38 millions of passenger earnings. So I say, taking the Pennsylvania's experience, it tends to show that the figures of the accountants for the Baltimore & Ohio are in the right direction, even if they are not absolutely accurate.

What is the effect of this upon the Pennsylvania? It leaves that great, vast Pennsylvania property in that terminal, but its share of the Pennsylvania Railroad that is used in passenger service is practically not adding one penny to the revenue. The net result of that, as figured out in 1911 by Mr. Bunting was that the passenger service was making a return upon the property invested in the passenger business of about one-third of 1 per cent. a year, and at the same time the property invested in the freight service was earning a return of over 7 per cent. Since that time passenger ratios have grown worse and not better. Although we have not the exact figures for this year, it may be safely asserted that upon the same basis we would find no return at all from the passenger train service.

NORFOLK & WESTERN

So much for the Pennsylvania. To the south of the Baltimore & Ohio is another railroad which everybody recognizes is peculiarly well-managed, allied with the Pennsylvania and having in Mr. Johnson, an extremely competent president—the Norfolk & Western. Its conditions are different. They too have undertaken to separate the passenger and freight service. They have done it since 1907. Apparently when they started they took as their basis the same operating ratio for the two, which was 64.8 or 64.7, the operating ratio of both freight and passenger. What has the movement been? In freight but a very slight increase. It increased from 64 to 65, an increase of a little over one point. But in passenger service the increase has been from 64 to 72.

NEW YORK, NEW HAVEN & HARTFORD

We come lastly to the one railroad in the United States whose passenger train revenues exceed the freight train revenues, and that is the New Haven road. It is now managed by a man known as an able railroad manager, and Chairman Elliott, in his statement to the stockholders only a few days ago, stated the result of the operation of his road. He said more than 50 per cent. of the revenue comes from passenger trains, and for passenger trains the cost of operation is so great as to leave nothing whatever for taxes or investment.

What are the probabilities of those figures being correct? We have merely to consider what the passenger service is today and what it was. We know this increased cost that has come through increased wagese. As stated, they are between 30 and 40 per cent. in this period of years since the late nineties. They have been very large in these recent years since arbitration. In the freight business the increased productivity has enabled the management to overcome the increased rate of wage, and the labor cost has been reduced, although the wage has been increased. But when you come to the passenger service you have a very different situation. With the introduction of steel cars you are carrying 50 per cent. more dead weight to every passenger than you carried before. All of the other expenses are similar, and what have you gained? Not anything in carrying capacity. If there has been a growth of density of traffic and your trains before were not full, you have gained something by carrying more passengers per car; but in these older eastern communities where the passenger traffic is large and where every seat is taken in every passenger coach ordinarily, you have gained nothing, but it has been a mere addition to the cost of carrying the pas-

senger. And what more? The electric light, the ventilation, sanitation, and all of those things which we have and which we ought to have, cost money. Not only have these particular things cost money, but there has been nothing to counterbalance that increase in the cost of operation which comes from the increased wage and from governmental regulations in the aid of safety to humanity. It is just what we should have expected. And there is the expensive Pullman service. Prosperity brings more use for Pullman cars. Prosperity brings not only more use of Pullman cars, but a greater use on the part of each passenger. Every time a man takes a section instead of a berth and it is necessary to put on another Pullman, and every time you substitute a steel Pullman for a wooden Pullman, you are adding more to the railroad's expense. There is nothing in those figures to create even doubt. They are perfectly in accord with what a man reasoning on this subject would expect.

UNREMUNERATIVE MAIL PAY

Then there is one other element in connection with this passenger train service which we expect to find unremunerative, and more and more unremunerative, and that is the matter of the railway mail pay. A committee of Congress is now investigating this subject, and it would be improper, in advance of that investigation, to express any opinion, certainly as to what the government ought to pay for the railway mail service. It is contended by the representatives of the government that the ordinary rules should not apply as to compensation; that by reason of what the government has given to the railways in protection, in rights of way and the like, there should not be expected that same return upon government business that there is upon private business. It is unnecessary to express any opinion as to whether that view is correct. But it seems to be contended by the railway representatives, and sincerely contended by them, that there is a great underpayment, and the representatives of the Baltimore & Ohio, figured an underpayment of over five hundred thousand dollars a year. It would not be surprising if Mr. Peters' contention that fifteen million dollars are withheld from the railroads, which ought to be paid to them, is correct. We know that there is a weighing of mails only once in four years, and we know the rapid increase in mail weight each year. We know that since the parcel post has been introduced that increase has been particularly rapid. We cannot, I think, feel any grave doubts that carrying the railway mails is an unremunerative service to the railroads.

So I say, when you are trying to find out why it is that these railroads, as compared with other businesses, have failed to overcome these increases, you will find in the passenger department of that business a very important explanation. But that is not all. Let us pursue the same process exactly and turn again to these railroads which seem not to have suffered as the Baltimore & Ohio, the New York Central and the Pennsylvania and others have suffered, from the great increase in operating cost.

Let us turn again to the Kanawha & Michigan and the Hocking Valley, to the Pittsburgh & Lake Erie and to the Bessemer & Lake Erie, and what do we find there?

I spoke of the extraordinary advance which Mr. Willard had made in train efficiency in three years. Extraordinary as his advance is, he reached only, in the year 1913, an average of 650 tons per train. That was his train load. If you will look at the Hocking Valley, you will find that the Hocking Valley had 851 tons, the Bessemer & Lake Erie had 1,001 tons and the Pittsburgh & Lake Erie had 1,157 tons. But that does not mean that Mr. Willard is not as efficient as the managers of these other companies. We have no reason to believe that, certainly, and when we turn to the Pittsburgh & Lake Erie and remember that the Pittsburgh & Lake Erie is a part of the New York Central system, we have an important confirmation and protection of Mr. Willard against any suggestion that he has not been efficient. While the Pittsburgh & Lake Erie Railroad trainload is 1,157, the trainload of its parent company, the New York Central Company, is only 432 tons.

CHARACTER OF FREIGHT TRAFFIC

There must be some other reasons. What is that other reason? It is the character of the freight traffic. Mr. Willard failed to obtain a higher trainload, as compared with these other railroads, because the percentage of his traffic which is heavy bulk freight, as the products of mines—coal, ore and coke—is smaller than that of these other roads. He therefore cannot effectuate, as to a part of his traffic, and a larger part than on any of these other roads—he cannot effectuate, utilize and apply this heavy efficiency, this heavy train movement through which he accomplished what he did.

On the Hocking Valley 80 per cent. of all the freight is products of mines; on the Bessemer & Lake Erie 87 per cent. of all the freight is products of mines, and on the Baltimore & Ohio only 65 per cent. of all freight is products of mines. It makes a world of difference. Coal and ore are carried in these large cars. With the money borrowed by the Baltimore & Ohio they have been carrying 50-ton cars, loaded not only to capacity but to a large extent above the loading capacity—50-ton cars carrying 55 tons in very many cases. How do they move? They move just as rapidly and just as slowly as is necessary to carry that load from one place to another, the largest load, which, consistently with railroad conditions, can be carried from one place to the other, and carried, as you see, in the smallest number of cars which it is possible to carry that load in. In the carrying of that freight there has been no increased cost; there has been a greatly decreased cost.

EXPEDITED SERVICE

Mr. Willard has on his line a great deal of other traffic. That is not ordinary merchandise traffic, but is carried to a great extent at a better rate than this heavy bulk traffic, when you consider it in cents per hundred pounds or per ton. In regard to this freight there is the very important element—time. It is special despatch freight, and there is a great deal of difference in the cost of moving it rapidly and the cost of moving the other freight slowly, or the same freight slowly, because you cannot load the train as heavily. There are different degrees of expedited freight. Some of it goes very quickly, like the packing house products from Chicago to New York—in 60 hours. Then there is freight which is not classed as despatch freight but is nevertheless rapid time freight. In the figures which Mr. Willard has worked out in order to determine what could be done in order to lessen the cost in respect to what seemed to him, economically, an unnecessary despatch service, he found that the average percentage of trainload of the time or special despatch freight was only 63 per cent. of what it was on the slow freight or ordinary freight, as it is called. What an immense difference that is in cost! Here is a large part of this freight as to which you can only get 63 per cent. trainload capacity. The big cities vie with each other for this express service, and that movement has gone on. And the cost of it is huge.

Mr. Willard has figured out, in undertaking to find out where operating economies could be made, how much he could save by turning a part of these special despatch freight cars into ordinary freight, by merely having them take 24 hours more for the journey; by making the cars run 85 per cent. capacity instead of 63 per cent., and by making that apply not to all the special despatch freight, but to all of that portion of the special despatch freight which he believed it was unnecessary to carry in that manner for economic reasons. He figured out that the saving is merely lengthening the schedule for three-fourths of the special despatch freight would amount to over four hundred thousand dollars a year.

You have a clear differentiation between the two kinds of freight. That has been going on increasingly; regardless of quantity, cars are sent out from our great cities and more expedited trains put on from time to time, and there is more traffic. You will find there why it costs more, and that in spite of the efficiency introduced by Mr. Willard through this heavy train movement, which has not the difficulties we have considered.

Convention of Railway Storekeepers' Association

Eleventh Annual Meeting Held at Washington, D. C.; Reception by the President of the United States

The eleventh annual convention of the Railway Storekeepers' Association was held at the Hotel Raleigh, Washington, D. C., May 18, 19 and 20, J. W. Gerber, general storekeeper of the Southern Railway at Washington, presiding.

The convention was opened with prayer by the Right Reverend Alfred Harding, bishop of Washington, after which the association was welcomed to the city by Hon. Oliver P. Newman, commissioner of the District of Columbia.

THE PRESIDENT'S ADDRESS

President Gerber, in his opening address, spoke in part as follows:

The first two years of the life of this association can probably be best described as a period when we were finding ourselves. This is indicated by the papers discussed at that time. At the convention of 1907, President Rice, in his address to the association, stated that he believed that we have proven to our superior officers, each year, that we are benefited by coming together as an organized body.

What was true then is true today and each year of the life of the association has seen a broadening of the scope of its work, making possible more systematic and intelligent methods in the ordering and handling of material and supplies and an increasing effort on the part of the members to place the work of the stores department on the highest possible plane.

Through the work carried on by the members special interest has been created in the reclaiming of serviceable material from scrap, the elimination of obsolete material from stocks, better methods of accounting, and a realization of the responsibility that is ours in connection with the handling and care of the vast amount of material required in railway operation.

We have seen the adoption by the association of a standard classification of scrap, a standard material classification, standard specifications, classification and inspection rules for railroad construction oak timbers, these specifications having been accepted as recommended Practice by the Master Car Builders' Association and Master Mechanics' Association, and adopted by the Hardwood Manufacturers Association of the United States.

While the adoption by the association of a standard scrap classification has reduced the work of the scrap classification committee, I believe that the committee could be profitably engaged in considering suggestions of changes in the classification to meet changing market conditions, and the collecting of information showing the advantages of a uniform classification for scrap material. The classification recommended by the association will not take the place of the various scrap classifications now in use by the railroads until we can show by specific examples that the Railway Storekeepers' classification does possess advantages over the other classifications. The subject is one which concerns every railroad and a great many of our manufacturing plants.

The committee on standard buildings and structures, appointed since our last convention, has already shown the necessity for such a committee, and the information gathered and placed at the service of the lines represented in the association is of great value. Through the work of this committee we can keep in touch with the latest and best designs in the construction of storehouses, oil houses, lumber sheds, casting platforms, scrap docks, etc.

The committee on the book of standard rules will present a report representing a vast amount of labor on the part of the committee members and providing in every detail for a complete stores department organization. No more important work has had the consideration of a committee of this association. I think we can safely predict that the value of the book of rules will be quickly recognized by all railways and that it will become the hand book and guide in the daily operations of stores departments.

The growth of the association has been very gratifying, and although counting an existence of only 11 years, we now have more than 215,000 miles of railways in the United States represented by membership in the association, the equipment of these lines totaling more than 57,000 locomotives and 2,400,000 cars.

A very large proportion of the railway mileage of the Dominion of Canada and the Republic of Mexico is represented in the association and we also have representatives of the railways of England, Australia, Japan, China, Cuba, Honduras, South and East Africa.

The active membership is over 700. Membership alone, however, is not our principal claim for the benefits arising from the Railway Storekeepers' Association. Rather it is the awakened interest in the daily work of the stores department employees, and the putting into effect of better methods resulting in greater efficiency and economy in railway operation, all of which is being accomplished by the bringing together in one association of representatives of the stores, purchasing and accounting departments.

FAIRFAX HARRISON'S ADDRESS

Fairfax Harrison, president of the Southern Railway, after a few opening remarks commending the association for the good work it was accomplishing, gave the following address on The Ideal Storehouse System:

No other business enterprise requires so many different things in such large quantities as a railroad, and the importance of the storekeeper in the railroad organization may be measured by the value of the materials and supplies for the safekeeping and proper issuance of which he is responsible.

The statistics of the Interstate Commerce Commission covering railroads having gross revenues of over $1,000,000 per annum, show that these companies, operating 239,938 miles, had on hand, on June 30, 1913, materials and supplies valued at $317,773,723, or an average of $1,324 per mile of road. Including materials and supplies carried by the Pullman Company, this total is brought up to something over $322,000,000. If we assume that these balances represent a three months' supply, this would mean that your monthly receipts and issues would aggregate something over $100,000,000 and that you handle during the course of the year property to the value of approximately $1,200,000,000.

For the successful and economical handling of property of this enormous value it is essential that your business shall be thoroughly systematized in all of its departments, and meetings such as this, where experiences can be compared and suggestions for improvements threshed out are of practical value to the companies which you represent.

It is the duty of the storekeeper to have on hand and to supply promptly anything that may be required in the operation of the railroad he represents. But the storekeeper must also bear in mind that money tied up in material and supplies is unproductive capital. It is earning nothing while the articles for which it has been expended are lying in the storehouse. On the contrary, storehouse balances are a source of expense to the company in interest, taxes and insurance. The ideal system, therefore, is one which will result in the article wanted being always on hand while the accumulation of an excessive supply of any article is always avoided. I need not tell the members of this association that this presents a difficult problem. It is one, however, that I believe is possible of solution. In my opinion

the solution lies in effective team work, not only within the organization of the general storekeeper, but between his organization and all of the men of other departments to whom materials and supplies are issued. On every large railroad system there are liable to be accumulations of material at certain storehouses while others may be short of the same material, and the general storekeeper may often be able to keep down his total balances by transferring the surplus from a point where it is not needed to the storehouse needing it.

The men who use supplies can be most helpful in aiding the storekeeper to avoid the accumulation of excessive supplies of material in current use and in preventing the accumulation of obsolete stores. The natural disposition of everyone using material is in the direction of accumulating large supplies in order that his work may not be held up while waiting for some essential thing. He should, however, realize that it is to the interest of the company by which he is employed that an undue proportion of its capital shall not be tied up in storehouse supplies and he should loyally co-operate with the storekeeper to keep these down by carefully estimating his requirements.

It would seem that, under an ideal storehouse system, such a thing as the accumulation of obsolete stocks, except insofar as obsolete parts are salvaged from condemned equipment and structures, should be impossible. There is only one way in which it can be made impossible and that is through intelligent co-operation by the users of supplies. The storekeeper should be advised of any change of standard, not when it has actually been made, but as soon as it is in contemplation, in order that he may work off his stock and have a minimum amount of the old standard on hand when the new one is adopted.

I know that there is nothing particularly new in what I have said to you. Much the same ground has doubtless been gone over in former meetings of this association and improvements in practice have doubtless resulted. I think you will agree with me, however, that perfection has not yet been attained and that storekeepers, those who draw on them for materials and supplies, and the executives of the companies should all co-operate to bring about, as nearly as practicable, the ideal condition of having no surplus stock in any storehouse and of always having the thing that is wanted, when and where it is wanted.

REPORT OF THE SECRETARY-TREASURER

The report of the secretary-treasurer showed an active membership of over 700 and a balance on hand of about $700. A number of letters were read from railway presidents commending the work of the association.

ACCOUNTING

The accounting committee, consisting of E. E. McCracken (B. & L. E.), E. L. Fries (U. P.), P. J. Shaughnessy (Erie), H. H. Laughton (So. Pac.), W. E. Brady (A. T. & S. F.), D. A. Williams (B. & O.) and C. C. Dibble (C. C. C. & St. L.), gave a very complete and detailed report on the rules governing the accounting for material and supplies at storehouses. It was divided into four parts—Handling of Materials and Supplies, Accounting for Material Received, Accounting for Material Issued and Material on Hand.

Discussion.—A. A. Goodchild (Canadian Pacific) took exception to several points in the report, particularly those pertaining to cash discounts, and second-hand serviceable material.

A member of the committee stated in explanation that it was not the intention in the report to cover the practice in use on any particular road, but the report was given as the most desirable practice to be employed. The president explained that the report was not binding on any road. The report was adopted and referred to the Association of Railway Accounting Officers.

RECEPTION BY THE PRESIDENT

On Monday afternoon members were driven to the White House, where they were received by the President of the United States.

STORE DEPARTMENT EXPENSES

E. L. Fries, auditor of disbursements, Union Pacific, presented a paper on this subject, from which the following is taken:

In order intelligently to understand, criticize or control, by comparisons or otherwise, the cost of operating the store department, it is fundamentally necessary to have a common understanding as to the expenses which should be considered as, and charged against, store department operations, and the method of distributing store department expenses.

Generally speaking, store department expenses consist of amounts expended for purchasing, handling, and storing material and supplies, and distributing them from the store department stocks, including the pay of officers and employees in the purchasing and store departments and their traveling, office and other expenses.

In the following an endeavor has been made to set forth the principal and general expenses which are concerned and connected with store department operations:

Purchasing.—Store department expenses are chargeable with the pay of general and local purchasing officers and their assistants and employees of the purchasing department; also their traveling, office and other expenses incurred in purchasing material and supplies, whether for store department stock proper, or for direct shipments to certain work, jobs, or other departments, with the following exceptions:

(a) Amounts expended for purchasing stationery are chargeable to stationery department expenses.

(b) Pay and expenses of officers and employees engaged in purchasing a single class of material or supplies, such as ties or fuel, are chargeable directly to the cost of that material or supply.

Storekeeping.—Store department expenses are chargeable with the pay of general, division and local storekeepers, and other store department officers and their assistants, and office, storehouse and store yard employees; also their traveling, office, storehouse, yard, and other expenses incurred in ordering, receiving, handling, storing, issuing, recording, reporting and accounting for store department stocks of material and supplies. To this there are the following exceptions:

(a) Pay and expenses of stationery storekeeper and stationery store employees; also their traveling, office and other expenses incurred in operating the stationery store, are chargeable to stationery department expenses.

(b) Pay and expenses of commissary storekeepers and commissary store employees; also their traveling, office and other expenses incurred in operating the commissary stores, are chargeable to commissary department operations.

(c) Pay of fuel keepers, or proportion of pay of storekeepers when acting as fuel keepers, is chargeable to fuel accounts.

(d) Labor handling rail and tie storage stocks is chargeable directly to the cost of such stocks.

(e) Labor handling fuel (except that carried in store department stock, such as coke, smithing coal and charcoal) is chargeable to fuel accounts or the appropriate operating expense accounts.

(f) Services, foreign to storekeeping, rendered other departments, such as motive power and car department timekeeping—which may be done by the storekeeper as a matter of convenience—are chargeable directly to such departments and the appropriate accounts covering their operations.

Inspection.—Pay of chemist and engineer of tests, and other inspection and testing officers and their assistants and employees of the testing department; also their traveling, office and other expenses incurred in inspecting and testing material and supplies, are chargeable as follows:

Pay and expenses of officers and employees engaged in inspecting or testing a single class of material or supplies—such as ties, rails, or fuel—are chargeable directly to the cost of that material or supply.

Labor and other expenses incurred in testing or inspecting mechanical devices or appliances, and making chemical analyses, are chargeable directly to the appropriate accounts affected.

A proportion of the general expenses of the inspection and testing department, based upon the work done during the month

for the various departments, is chargeable to store department expenses.

The cost of inspecting miscellaneous material and supplies for or in store department stock, when it is deemed impracticable to distribute it to the cost of the goods, is chargeable to store department expenses.

Amounts paid outside inspectors or inspection bureaus for inspection of material and supplies should, as far as practicable, be identified with, and added to, the cost of the particular items of stock inspected, otherwise charged to store department expenses.

Switching Service.—Store department expenses are chargeable with all expenses, including wages, fuel and supplies, of operating switching locomotives when exclusively assigned to the service of switching at material storehouses and in material store yards. Expenses of incidental switching at material yards by locomotives in regular switching service should be charged to the appropriate operating expense accounts.

Motive Power and Car Department.—Store department expenses are chargeable with the pay of employees and other expenses incurred by the motive power and car department, when acting in lieu of the store department in the handling of store department stocks. Labor delivering supplies to locomotives and cabooses, and pay of motive power and car department supplymen, toolmen and messengers, are chargeable directly to the appropriate operating expense or other accounts affected.

Maintenance of Way Department.—Store department expenses are chargeable with the pay of employees and other expenses incurred by the bridge and building and track departments, when acting in lieu of the store department in the handling of regular store department stocks, such as those in lumber yards and track material yards.

Expenses of handling track material on sections, and bridge and building material in the hands of gangs along the line, are chargeable directly to the appropriate operating expense or other accounts affected, according to the work or jobs for which the material is intended.

Labor unloading track or bridge and building material for work or jobs at points along the line, is chargeable directly to the appropriate operating expense or other accounts affected by the work or jobs for which the material is intended.

Labor handling and loading material from stock by the bridge and building and track department employees for rush or emergency jobs, is chargeable directly to the operating expense or other accounts affected by the work or jobs for which the material is intended.

Construction Department.—Pay and expenses of construction storekeepers, and all other expenses incurred in receiving, handling and issuing stocks of material and supplies on the jobs and in construction material yards—maintained for the specific and exclusive purpose of conveniently handling and issuing material for construction—are chargeable directly to the accounts covering the jobs or work being served.

Company Industries.—Where supplies—such as coke, pig iron, copper and sand—for rolling mills, foundries and other company industries are handled by store department employees, the cost of handling should be charged to store department expenses, and the regular percentage for store department expenses assessed on the issues. When the handling is performed by other departments, the expense should be charged directly to, and included in, the cost of the products, and only a special percentage for the expenses of the purchasing department should be assessed.

When the products of rolling mills, foundries and other company industries are issued by the store department, the regular percentage for store department expenses should be assessed.

Handling Rails and Ties.—Labor and other expenses incurred in handling (receiving, storing, issuing and shipping) rails and ties, are chargeable as follows:

Labor handling rails and ties when carried in store department stock proper, and directly handled and issued by store department employees, is chargeable to store department expenses; and the regular percentage for store department expenses should be assessed on issues from such stocks.

Labor unloading new rails and ties to storage banks or yards, is chargeable to the cost, and should be included in the prices of such stocks.

Labor handling, loading, and unloading new and second-hand rails and ties for and on jobs, is chargeable to the appropriate operating expense or other accounts affected, according to the nature of the work or jobs.

Labor handling, loading, and unloading new and second-hand sale orders, or to the store department, is chargeable to operating expenses.

Handling Ice.—All expenses in connection with the handling and packing of the ice crop, is chargeable to the cost of the ice and should be included in the price.

Handling and delivering ice to trains, etc., is chargeable directly to the appropriate operating expense accounts.

Bridge and Signal Material, Structural Steel, Etc.—The expenses incurred in handling structural steel, bridge material, etc., shipped directly to jobs and not handled by or through the store department, should be charged directly to the accounts covering the jobs for which the material is intended.

Handling Scrap.—All expenses of handling, dismantling, breaking up, sorting, loading and delivering scrap or second-hand material to the store department should be borne by the department making the transfer, and charged to the appropriate operating expense or other accounts affected. This refers to all expenses incurred up to and including the initial delivery, the dismantling of trucks and placing of scrap or second-hand material on cars or in bins, platforms or other places designated by the store department as the delivering points.

The entire handling and loading expense incurred subsequent to the initial delivery to the store department, is chargeable to store department expenses, this on the principle that such handling of scrap and second-hand material is a storekeeping proposition incidental to the issuance of new material.

The expense of unloading, handling and sorting of scrap at company industries and plants where it is recovered, repaired or reworked, is chargeable to the operations of such industries and plants.

Accounting.—Store department expenses are chargeable with the pay and other expenses of the general, division and local store department material accounting forces; also salaries and expenses of material accounting forces in superintendents' offices when engaged exclusively on material accounting.

Expenses of incidental material accounting in superintendents' offices is chargeable directly to operating expenses.

Pay and other expenses of officers and employees of the accounting department engaged in material accounting in the general offices, are chargeable directly to operating expenses.

Interest on Stock Investments, Rental of Storehouse Facilities, Insurance on Stocks.—No amounts representing interest on the stock investment, the use of storehouse facilities, or insurance on material stocks, should be charged to store department expenses, as the cost of constructing store building and contiguous facilities and the subsequent maintenance thereof, is chargeable directly to construction, additions and betterments, or operating expenses, as the case may be; and the amount representing insurance and any premiums paid, is chargeable directly to operating expenses.

Application and Distribution of Store Department Expenses.—Percentage rates, representing store department expenses, should be assessed according to the issues, segregated as between the following two classes:

(a) All material and supplies issued;

(b) Only material and supplies handled and issued through the store department.

Separate percentages (one designated as special and the other as regular) should be applied to the value of the material in each of the above classes.

The special percentage, applicable to the value of all material

issues; (a), and representative of only the cost of purchasing, should be obtained by dividing the purchasing department expenses by the total value of all material and supplies issued.

The regular percentage, applicable only to the value of material issued through the store department; (b), and representative of the total cost of purchasing, handling and accounting, should be obtained by adding to the above mentioned special percentage, the percentage representative of only the cost of handling and accounting, to be obtained by dividing this cost by the value of material handled and issued through the store department.

EXAMPLE

Cost of purchasing	$5,000.00
Cost of handling and accounting	30,000.00
Total cost	$35,000.00
Material issued through store department	$600,000.00
Material shipped directly to location of intended use	400,000.00
Total material issues	$1,000,000.00
Special percentage:	
$5,000.00 ÷ $1,000,000.00	0.5 per cent.
Regular percentage:	
$30,000.00 ÷ $600,000.00	5.0 per cent.
Plus special percentage	0.5 per cent.
Regular percentage	5.5 per cent.

The percentage should remain in effect until conditions may warrant a change, which may be made monthly or otherwise during the fiscal year.

Store department expenses are chargeable on the value of material issued for construction and additions and betterments, as well as for operating expenses.

Store department expenses are not chargeable in connection with transfers of material and supplies as between stores and stock accounts.

Store department expenses are chargeable on the value of the gross issues from stock, regardless of value of scrap and second-hand material released and received in exchange.

Store department expenses are chargeable on the value of the material issued to the shops for the manufacture of goods on store department orders.

Store department expenses are also chargeable on the value of all shop manufactured goods issued from store stocks.

Store department expenses are chargeable in connection with sales of material and supplies from store department stocks.

Ledger Account—Store Department Expenses.—A ledger account entitled "Store Department Expenses" should be established, for the specific and exclusive purpose of providing a suspense account through which to clear all debits and credits appertaining to the operation of the store department.

This account should be credited with the amounts accruing from the application of the regular percentage for store department expenses to the value of goods issued from stock, including sales; also with the special percentage applied to the value of goods purchased and shipped directly to consumer, commonly known as direct shipments. The balance in the account, if debit, would represent undistributed expenses due to the prescribed percentages being insufficient to clear the account; if credit, due to the prescribed percentage being greater than the percentages that would have cleared the account.

The account should be cleared in June account of each year by using for the prescribed percentages, the rates of per cents. that the actual expenses bear to the actual total material issues for the month.

Stationery department expenses should be handled separately from, but similarly to store department expenses.

Discussion.—There was considerable discussion as to whether or not the fourth exception under Storekeeping conflicted with the second paragraph under Handling Rails and Ties, but little headway was gained by it. The author stated plainly that there was no conflict if the two paragraphs were properly interpreted and the paper was referred to the accounting committee for consideration and adoption.

STANDARDIZATION OF TINWARE

The committee on the standardization of tinware reported that it is working in conjunction with a similar committee of the Master Mechanics' Association. The report is to be considered at the June convention of the latter association in Atlantic City, after which arrangements will be made for its presentation for the action of the Storekeepers' Association.

UNIFORM GRADING AND INSPECTION OF LUMBER

A majority and a minority committee report were submitted on this subject, the latter by W. H. Clifton, Baltimore & Ohio. In the discussion, several members approved the minority report, but many, while holding the belief that it was desirable as an ideal toward which to work, questioned its practicability. The minority report took the stand for inspection of all lumber at the point of shipment, and the differences of opinion hinged mainly on this. W. F. Jones (N. Y. C.) suggested the formation of a bureau for the inspection of lumber at the mills for all railways. This, it was claimed, would largely do away with the increased expense and the difficulty of keeping inspectors busy when inspection at the mills is carried out by the roads themselves.

It was finally moved that the members of the committee get together and endeavor to arrive at an understanding. This was done and the amended majority report was adopted as recommended practice and referred to the American Railway Association. Following is the amended report:

The committee on uniform grading and inspection of lumber were requested by the executive committee, first, to make a recommendation as to whether material inspection should be done at destination or at the point of shipment, and second, to report on the uses of various woods in place of oak for stock and box cars.

The committee is unanimous on the following:

(1) That all piling and track ties should be inspected when received and loaded at shipping points.

(2) That all material which is termed direct shipments, that is, shipments for construction, whether it be bridge or building material should be inspected before loaded or rather at the shipping point, for the reason that it is seldom that there are practical men where the material is unloaded to inspect and receive it and if such is the case, inferior material is often accepted and used.

(3) Lumber which is shipped direct for any purpose ought to be inspected when loaded at the shipping point. To illustrate: The Missouri Pacific runs through a timber country. The probability is that 75 per cent. or more of its switch ties are loaded at the mills and shipped direct to the point where they are to be used. In such cases it is always practical and advisable to have the material inspected at the shipping point before loaded. The same holds true in the extreme Northwest.

[A paragraph was here inserted, replacing a list of the differences between the committee members and recommending the formation of a bureau for the joint inspection of lumber. It was also recommended that after lumber is once rejected, it be not accepted for any purpose.]

The committee reported on the second request that the Chicago, Milwaukee & St. Paul has been using Douglas fir in place of oak for the following purposes:

For Stock and Box Cars: Sub sills; nailing strips; eng. plates; carlines; cross ties; needle beams; side braces; end braces; ridge pieces; cornice side; belt rails, end and side; side door headers; side door cleats; end door cleats; stock car slats, side and end.

For Locomotives: Pilots and pilot slats; running boards; foot boards and steps; cabs; bumper beams; longitudinal sills for tenders; foot boards; foot steps and coal gates for tenders.

Other roads in the Northwest and Canada have been using maple for draft timbers and find that it has given as good or better service than the average oak which they receive from the South.

STANDARD BOOK OF RULES

The report of the committee on the standard book of rules consisted of a set of rules comprising a book of 146 pages. This is intended as a foundation for building up a store department on

new roads or reorganizing on roads which already have such a department. It is very complete and is a combination of and selection from the best methods now in use on many different railways. It is not intended that it should be binding on any road to adopt it, but the committee believes that with the necessary changes to suit local conditions it forms the best means of organizing an efficient store department. The book was discussed in sections and a number of slight changes suggested. It was finally approved and adopted.

HANDLING OF STATIONERY

The following is from a paper on this subject read by S. C. Pettit, stationer, Grand Trunk Pacific:

Stationery is used by all departments from the office of the president down to the section foreman, and is subjected to greater amount of waste than any other item of supplies, and for this reason should be carefully watched. Every day we see expensive forms used for making memorandums. Further, take typewriter supplies. I know the operators do not get the full life out of either ribbons or carbon paper and they know little or nothing about the mechanism of a machine and, in trying to make some slight adjustment, put it out of commission and entail a cost of four or five dollars or more for repairs.

When preparing samples of new forms of blanks and books, they should be kept within the stock sizes of paper to avoid cutting to waste.

Form numbers should be assigned by the stationery agent, and we have found the method of showing the department initials, M. C. B.; G. P. A.; M. P., etc., very satisfactory, as it not only enables one to readily distinguish various department forms, but it keeps down the numbers, and greatly assists in grouping the stock on the racks. In arranging the stock on the racks, it has been found most convenient to have the forms that are used the most, or I might say, ordered on the majority of requisitions, nearest the table where the material is assembled for packing.

"What has been found to be the best method of checking in stationery to determine positively that the full quantity charged is actually received?" Our method is, when ordering, to specify size of form, weight of paper required, number of sheets in each pad and number of pads in a package. By following this method the pads and packages are of uniform thickness and weight, and by weighing packages discrepancies can be discovered.

It is not good practice to allow suppliers to ship or deliver items of stationery or printed forms direct to the various offices, as it leaves the way open for all kinds of discrepancies, such as short count, substitutions, etc. Those receiving such consignments in most instances do not take the interest in checking the items that an employee of the stationery department would and if all goods were delivered at the stationery department, a proper record would be taken and the goods examined and any discrepancies corrected before delivery is made to the department originating the requisition.

The man who purchases stationery should be an expert, familiar with all lines of stationery and printing, the different sizes and qualities of paper, and be able to estimate the cost of printing as well as the printer can. If the stationery stock is kept under the supervision of such a man, he should have his office adjacent to the stock where he can see at all times that goods received are as ordered, and you cannot do the work under the supervision of the general storekeeper without such a staff in addition to a man who is as expert as the buyer; therefore, I should like to have some one produce figures showing that the stationery can be handled more economically under the supervision of the general storekeeper.

In my opinion the stationery should be kept in the general office building, to enable the stationery agent to be in close communication with general officers who are all interested in the forms used in connection with the work of their departments and frequently call for copies of such forms on short notice.

Discussion.—J. P. Murphy (L. S. & M. S.) did not agree with the author that the stationery should be kept in the general office building. He also thought the stationery should be under the store department.

E. J. McVeigh (Grand Trunk) stated that the most important consideration in connection with stationery is its distribution. The stationery agent should be in touch with the conditions at the different points on the road so that he would have a knowledge of how great a supply was needed, not simply accept requisitions as approved by trainmasters and others.

G. G. Allen (C. M. & St. P.) said that his road is now handling stationery in the store department and that a number of economies have been made which could not have been accomplished under a separate stationery department. The consolidation has reduced the expense of handling and accounting, and it is possible to transfer men to other work at times in the month when work is slack in the stationery department.

The Southern Railway has a separate building under the charge of the accounting department for handling stationery and gets satisfactory results. The Burlington obtains good results from methods similar to those used by the St. Paul. The Buffalo, Rochester & Pittsburgh is adopting a system including a stationery storekeeper under the store department, and is also inaugurating a system of checking to prevent agents and others ordering excessive supplies. The paper was received by the convention.

PIECE WORK

The committee on piece work felt that there is but little to add to what has already been presented to the association in regard to the establishing and maintaining of the piece work or "unit" system of handling supplies and material in the store department. Data were, however, submitted in addition, relating to the best manner of establishing prices and to a comparison of day work and piece work costs taken from actual operations of different railroads.

The committee recommends a form to be known as form R. S. A. 200, as the best means of securing the necessary information on which to base piece work prices. This form should be placed in the hands of the storekeeper, or others in charge, so that whenever it is desired to make a new rate, or change an old rate where conditions have been changed, he may compile the data from actual operations. Before securing such data the storekeeper should study the operation carefully and make sure that there are neither too many nor too few men engaged in the work, and that the conditions are the best commensurate with such expenditure as the management will permit.

The data should then be obtained without the knowledge of the men doing the work in order that it will represent a normal day's work under normal conditions on a day rate basis. This is not done with any idea of being unfair to the men, but rather with the idea of being fair in all cases to both the company and the men. Should the men be aware of the fact that they were being watched and time observed on the operation which they were performing, it would be a very easy matter for them to regulate their speed so that the data would not be a true representation of a normal day's work, hence the price would be established on an unfair basis which would sooner or later prove unsatisfactory to the company or to the men. This is a condition that should by all means be avoided, hence the importance of securing data that do represent a normal day's work under normal conditions. As a further precaution this data should be secured by someone who is familiar with the material being handled, who understands men and knows how to handle them and what they should be able to accomplish under normal conditions in the handling of such material. There should be at least five operations observed on each schedule, and ten are better if time and opportunity will permit. It is not fair either to the company or to the men to establish a piece work price on one or two operations, for the reason that there is a liability of making a price either too high or too low. Too much care cannot be exercised therefore in establishing prices, for, while it is an easy matter, so far as the men are concerned, to increase a rate it is a very

difficult matter to decrease one, without creating dissatisfaction, unless there has been a change in conditions.

The data to be obtained and entered under the different column headings should be as follows:

Date.—The date the operation is performed.

Number of Men.—The total number of men engaged in the operation.

Hours Each.—Total hours each man works on the operation.

Total Hours.—Total hours for all of the men.

Material—Quantity.—Quantity of material handled under the operation.

Material—Unit.—The unit under which the material is handled.

Hourly Rate.—Hourly rate paid the men on a day rate basis.

Remarks.—Any additional information.

*Average Cost—per—.*The average cost per unit as indicated by the totals for all of the operations.

The storekeeper will then recommend the price in the space provided. In all cases the storekeeper personally should make his own recommendations for piece work prices and in no case should this authority be delegated to another member of his organization.

There are two blank lines provided for a full description of the operation on which the price is desired. This description should not only outline the kind of material to be handled but should state the kind of car, distance carried, and all other conditions which affect the operation.

After the data have been secured, form R. S. A. 200 should be made up in triplicate, the original and duplicate being sent to the general piece work inspector for his approval or disapproval, and the triplicate retained by the storekeeper. In all cases approvals should be made by personal signature of the storekeeper to these requests for prices. If the prices recommended meet the approval of the general piece work inspector he should instruct the storekeeper to make up form R. S. A. 201 (which is a reconstruction of form A as shown on page 147 of the 1910 proceedings of the Railway Storekeepers' Association), in quadruplicate, sending the original and two copies to the general piece work inspector with the original and duplicate of the data sheet attached, retaining the fourth copy for his file. The general piece work inspector should then approve and forward all papers to the general storekeeper or other official for his approval. If, however, the price recommended by the storekeeper does not meet with the approval of the general piece work inspector he should investigate further before authorizing the issuing of R. S. A. 201 to cover.

As a further argument in favor of the piece work system of handling material the committee secured and presented with the report comparative data on a number of operations showing the cost per unit on a day rate basis as compared with the cost on a piece work basis. These data were furnished from actual operations and showed the saving which it is possible to effect under the piece work system from a financial standpoint.

Discussion.—The report was accepted and adopted as recommended practice. A rising vote showed that of those roads represented at the convention, the New York Central, Atlantic Coast Line, Philadelphia & Reading, Chicago, Indiana & Southern, Burlington, Toledo & Ohio Central, the St. Paul and several others use a piece work system in handling stores.

OTHER REPORTS

On Wednesday morning the Committee on Recommended Practices presented a brief progress report. The Committee on Scrap Classification was not in position to report at this convention. Papers on the efficiency of employees of the store department were read and will be reported in next week's issue. J. G. Stuart (Burlington) explained a loose leaf stock book used on that road which is printed to obtain uniformity in naming parts and avoid copying each month. The Committee on Standard Buildings and Structures showed a number of photographs with dimensions and data regarding storehouses, making possible a choice to suit conditions in establishing a new storehouse. The Committee on Marking Couplers had no definite report and was continued. Discussion on the book of rules was concluded and the book adopted.

OTHER BUSINESS

An innovation at the convention this year was the furnishing, through the efforts of the Railway Materials Association, of a daily list, similar to those employed at the June conventions at Atlantic City, showing the registration, with each person's badge and room number.

On Tuesday the ladies were taken in auto buses during the morning to visit the principal points of interest in Washington, and in the afternoon all those in attendance at the convention were taken by boat to visit Mount Vernon and Marshall Hall, Md., where a Potomac river supper was served. This trip was under the auspices of the Chamber of Commerce of Washington.

ELECTION OF OFFICERS

The following officers were elected: President, G. G. Allen, Chicago, Milwaukee & St. Paul; first vice-president, H. C. Pearce, Seaboard Air Line; second vice-president, J. G. Stuart, Burlington. The secretary-treasurer will be elected by the executive committee. The Railway Materials Association elected C. B. Yardley, Jr., as president, and J. Parker Gowing, secretary-treasurer.

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299 ROADS IMMUNE FROM PASSENGER FATALITIES

According to reports compiled by the Bureau of Railway News and Statistics, 299 railways of the United States, operating a mileage equal to the combined railways of the United Kingdom, Germany, France, Austria and Italy, went through the fiscal year ended June 30, 1913, without a single fatality to a passenger in a train accident. The railways, which operate together 120,901 miles of line, constitute more than two-thirds of the operating companies making their annual reports to the bureau.

During the year the railways thus reporting complete immunity carried a total of 409,808,488 passengers an aggregate distance of 14,400,992,000 miles and 968,764,956 tons of freight a total of 141,790,227,000 ton miles. Almost one-half the entire railway traffic of the United States for the year thus was carried without one passenger being killed in an accident to a train.

This immunity record for the past fiscal year is the highest since the banner year 1909 and comes close to it, although traffic density, one of the largest factors affecting the probabilities of accidents, was more than 11 per cent. greater in the passenger business and more than 30 per cent. greater in the freight business of the railways.

Four railways reporting to the bureau, with a combined mileage of 1,411 miles, have been operated through 10 consecutive years without a single passenger being killed in a train accident. A year ago nine railways operating 4,379 miles reported entire immunity over 10 years, and one of them, the Lackawanna, had a clear record for 12 consecutive years before the Corning collision.

As a result of its 10-year records the bureau presents the following table of immunity showing the roads reporting complete freedom from passenger fatalities for periods ranging from one to the entire 10 years:

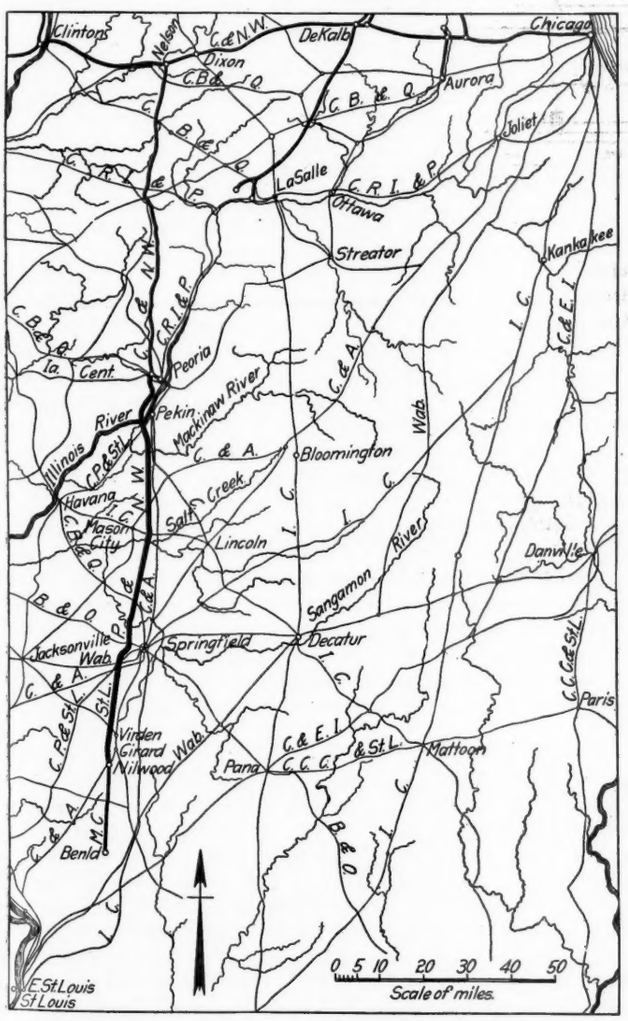
	No. of companies	Miles of line with no fatalities to pass. in train accidents
Ten years to 1913	4	1,411
Nine years to 1913	33	7,379
Eight years to 1913	57	10,832
Seven years to 1913	67	11,552
Six years to 1913	87	18,860
Five years to 1913	107	28,592
Four years to 1913	122	30,897
Three years to 1913	153	42,986
Two years to 1913	205	63,714
One year, 1913	299	120,901

Chicago & North Western Extension in Illinois

Construction Details on a 90-Mile, Modern Low Grade Freight Line Reaching Important Soft Coal Fields

In order to connect its branch line from Nelson, Ill., to Peoria with the Macoupin County Railway, a subsidiary road 24 miles long in southern Illinois, built to develop certain soft coal fields, the Chicago & North Western has built the St. Louis, Peoria & Northwestern a single track line 90.66 miles long between Peoria and a point just south of Girard. This connecting section will allow the large quantities of coal originating in the southern Illinois coal fields tributary to the Macoupin County line to move to Chicago and northern points entirely over the North Western instead of being turned over at Girard to the Chicago & Alton, as has been the general practice since the building of the Macoupin County Railway about nine years ago.

The investment that has been made in this new connection is one which promises early and consistent returns, for the mines now operating on the Macoupin County Railway have a daily



The North Western Lines in Illinois Showing Extension from Peoria to Nilwood

capacity of 10,000 to 12,000 tons of an excellent grade of coal. The North Western has secured approximately 75 per cent. of all the coal burned in its locomotives from the southern Illinois field and the handling of this coal alone would make the new connection very important to the system. The expenditure was further warranted in the opinion of the directors on account of the possibility of securing much higher efficiency from the mines and the existing coal road by the construction of a high grade freight line which could handle this traffic to the north and west expeditiously. It is expected that an increasing amount of this coal will be marketed in Chicago and other northern markets for domestic, steam and commercial use. The North Western already has extensive terminals in Chicago, which include about 120 coal yards, allowing it to handle this coal traffic at a minimum cost. The building of the new connection will allow the company to supply these yards with coal carried for the entire haul over its own lines instead of with coal received from foreign roads near the point of destination. An incidental advantage of the new line is that the distribution both of company and commercial coal on western lines will be considerably facilitated by the delivery of such coal on the main line at Nelson, Ill., instead of at Chicago.

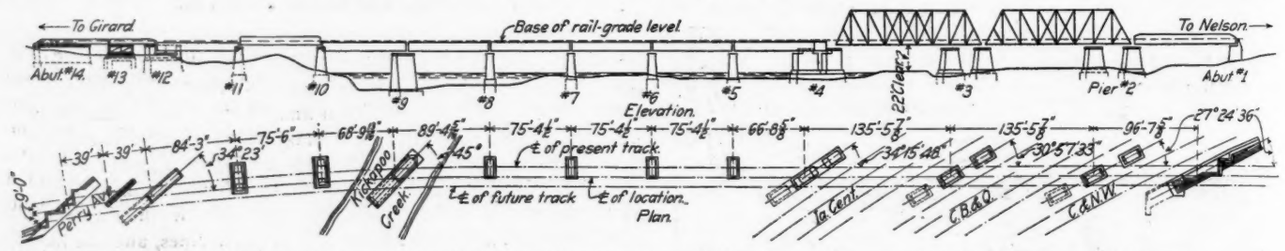
LOCATION, GRADES AND CURVATURE

As the new line is built primarily to handle this coal traffic, it was essential that it be constructed to high standards to enable the traffic to move in heavy train loads. To meet this requirement grades of 0.3 per cent. northbound and 0.5 per cent. southbound were adopted as standard and the maximum curvature was fixed at two degrees. The best location obtainable was adopted regardless of the fact that the line does not touch any existing towns. This was not a serious objection, however, for the territory traversed is already well served with passenger lines, and the fact that the new line will be required to carry only a small amount of passenger business will facilitate the movement of heavy freight. The line passes through a well developed and thickly settled district, making the expense for right of way unusually high. The grading is in general light and there are only three expensive bridges on the line. Wherever possible grade crossings with existing railroads were avoided, the North Western bearing the entire expense of separating such crossings, and although in so flat a country it is difficult to eliminate highway grade crossings, wherever opportunity offered highways were also carried overhead or underneath. On account of the very heavy incidental expense incurred in building through such a country, the cost of the line was higher than the character of the work would indicate. The total estimate for the 90 miles was about $8,000,000, or an average of $88,300 per mile.

The central portion of Illinois is a rolling prairie with some choppy sections along the rivers. The elevation of the connection with the old line at Peoria is about 243 ft. lower than the maximum elevation reached near the southern end, making it necessary to adopt a heavier ruling grade southbound than north. As the bulk of the traffic will be moving northbound from the coal fields, however, this condition is not objectionable. The 0.3 per cent. grade northbound has been adhered to in building the line, but in some places a 0.7 per cent. temporary grade southbound has been put in in order to hasten the completion of the work. These grades will later be lowered to the 0.5 per cent. standard. The line is exceptionally straight, having only 21 curves in the total length of 90 miles. These curves have a total central angle of only a little over 400 deg., or an average of about 4.5 deg. per mile. Long tangents are the rule, the three longest being 12.6 miles, 13.4 miles and 14 miles, respectively. The material encountered was principally clay and loam with some rock near the Peoria connection. The standard roadbed is 26 ft. wide in cuts and 20 ft. wide on fills. The track is laid with gravel ballast, white oak or creosoted soft wood ties and 90 lb. A. R. A. section B rail. While only a single track has been laid at present, the masonry in about 75 per cent. of the structures was built for a double track and all provisions are made for double tracking when the traffic requires it. Stations have been located about six miles apart, which are provided with 1,400-ft. industrial tracks. Passing tracks 3,900 ft. long are used. In order to shorten the

time necessary for building the road, a large number of small waterways were crossed by temporary pile bridges which will be renewed by concrete boxes or small arches. Cast iron culverts from 24 in. to 48 in. in diameter are used for small waterways.

The connection with the old line at the northern end is made about two miles west of the southern edge of the city of Peoria at a point where the old line is parallel with the Iowa Central and the Chicago, Burlington & Quincy. The new line rises to cross these old lines and a double track lead to the North Western yards in Peoria. The same structure which carries the new line over these tracks also crosses Kickapoo creek and a highway. The line swings to the left across the Peoria & Pekin Union and an electric line and then turns to parallel these roads for several miles across the flats adjacent to the Illinois river. The crossing of the Illinois river is made about two miles southwest of the city of Pekin on a seven-span steel bridge which includes one vertical lift span to allow the movement of river traffic. Just south of the river the new line crosses the Chicago, Peoria & St. Louis, and about five miles farther south a new yard and engine terminal is being provided. From the yard the line runs almost directly south for about 20 miles, crossing the Mackinaw river, the Chicago & Alton and the Illinois Central. A slight swing to the west is made to secure a favorable crossing of Salt creek, the road then continuing west of south to the crossing of Cantrall creek and the Sangamon river. South of the river crossing the line crosses the Baltimore & Ohio about two miles west of Springfield and then turns sharply to the west in order to make the overhead crossing of the Wabash, the Chicago, Peoria & St. Louis and the Chicago & Alton as easily as possible. Continuing a little west of south the line crosses Lick creek and about 12 miles farther on Sugar creek and the Chicago, Burlington & Quincy just west of Virden. About four miles south of Virden the line passes one mile west of Girard, and about two miles south of the town it swings to the east across the Chicago & Alton and the Illinois Traction System to a connection with the Macoupin County Railway just east of Nilwood.



Elevation and Plan of Kickapoo Creek Bridge Showing Skewed Crossings of Railway Tracks, Stream and Highway

The Kickapoo Creek Viaduct

PEORIA TO THE ILLINOIS RIVER

As mentioned above, the work is comparatively light, although some interesting features developed in handling it. The first mile from the northern connection is almost continuously in rock cuttings which have been widened to furnish material for the next eight miles of practically continuous fill. The crossing of Kickapoo creek, the Iowa Central, the Chicago, Burlington & Quincy, the Peoria yard connection and a highway is made on a steel structure consisting of a 100-ft. through girder, two 135-ft. through Pratt trusses, one 65-ft., three 75-ft., one 90-ft. and one 68-ft. deck plate girders; one 75-ft. through girder, one 84-ft. and two 39-ft. deck girders, making a structure with a total length of 1,056 ft. The railways are crossed at a skew of 27 deg. and 34 deg., the creek at 45 deg., and the highway at about 33 deg. The north end of the structure is on a tangent, but the south end is on a 2-deg. curve, which, combined with the skewed crossings, makes a complicated layout for the masonry, and in a number of cases, uneven lengths for the trusses and girders.

A long fill with a maximum height of about 30 ft. carries the line over the Peoria & Pekin Union, the Peoria Rapid Transit and three highways, running down on a 0.3 per cent. grade practically to the old ground level about three miles south of the Kickapoo creek bridge. For the next four miles the line is on a fill of from 5 to 10 ft., which is just sufficient to raise it above danger from overflows of the Illinois river, which is adjacent. Material for this fill was largely secured from side borrow by two drag line excavators. The fill in some places was topped out with steam shovels and near the river some gravel was hauled from a bank south of the river after the completion of the bridge for raising the fill up to the desired grade. The line just north of the river crosses a 3,000-acre drainage district which is enclosed by dikes and reclaimed for farming purposes. The reclaiming of these river flats has so restricted the channel area that the flood of the spring of 1913 was higher than any previously recorded. This fact, together with the possibility of the high water mark being still further raised by such developments, led to a decision to raise the grade of the new line about 2 ft. higher than had been originally planned across the valley of this river. It is thought that the line as built will be above any danger from floods.

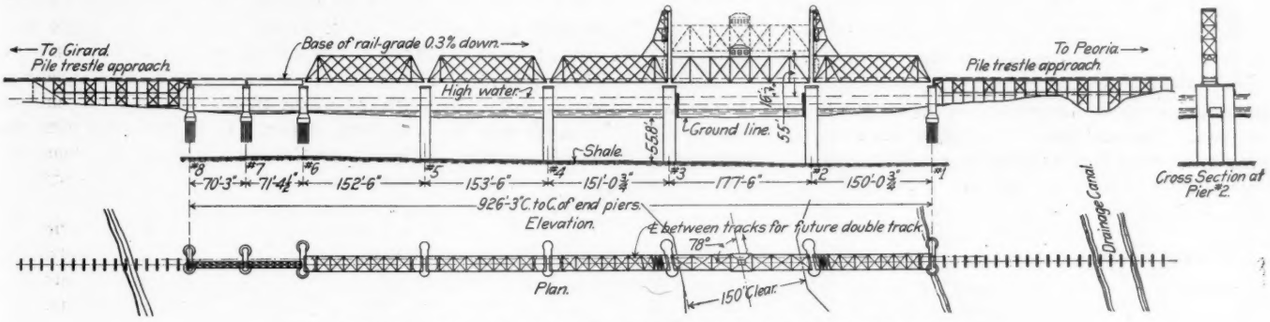
ILLINOIS RIVER BRIDGE

The Illinois river is crossed by a seven-span steel bridge with a total length of 2,926 ft. 3 in., with about 620 ft. of pile trestle approach on the two ends. The river has a depth of about 10 ft. at low water and about 25 ft. at high water, the width at low water being a little over 900 ft. The spans from the north end are one 150-ft. through latticed truss, one 175-ft. through truss vertical lift draw span, three 150-ft. through latticed trusses and two 70-ft. deck plate girders. Borings in the river at the bridge site showed streaks of blue clay near the surface, then sand and gravel to a depth of about 55 ft. under the lift span. At an elevation varying from about 372 to 382 the underlying stratum of shale was encountered. Comparative estimates and plans of various types of foundations were prepared for this bridge, including concrete piers built in open cofferdams and supported on piles, concrete piers supported on piles sawed off under water and built in open caissons floated into position, and concrete cylinder piers carried down to shale. The third plan was adopted and 15-ft. cylinders have been used for the lift span piers, 12-ft. cylinders for two other channel piers carried to shale, 10-ft. cylinders for two piers supported on

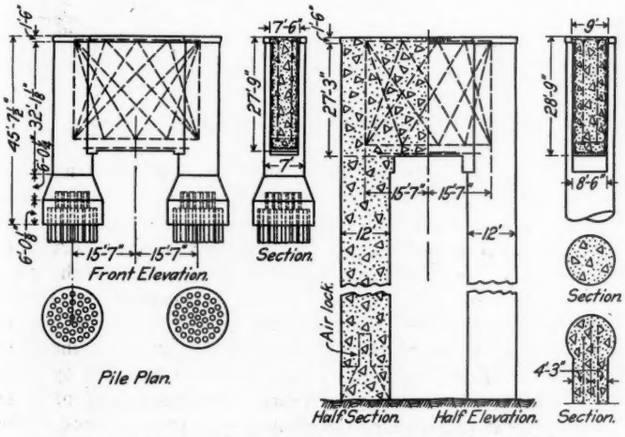
piles driven into clay and 8-ft. cylinders for the remaining two piers which are also supported on piles. In each case the two cylinders in each pier will be connected above the low water line by a pair of deep lattice web trusses embedded in concrete. The piers are designed for a double track bridge and the present single track will be erected east of the center line.

It was originally expected that the cylinders for these piers would be sunk by open dredging, but the contractor preferred to use the pneumatic process, and by providing air locks near the bottom of the cylinders this was successfully accomplished. Each cylinder in piers one and six is supported on 37 piles and in piers seven and eight on 30 piles. The piles used were 50 ft. long driven to refusal without a follower. The long cylinders were placed in 8-ft. sections, the bottom section being stiffened on the inside to form a cutting edge. The concrete for all the piers was placed from a floating barge.

The Illinois river is a navigable stream, and in the three summer months bridges in this vicinity are required to make about 125 movements per month. The lift span provides a 55-ft. clearance above high water in the open position and 15 ft. in the closed position. The towers and operating machinery were designed for double track, so that when the second track is added it will only be necessary to replace the lift span, using the present one at some other point on the road. The lift span will be operated by electric motors receiving current from the powerhouse at the engine terminal about six miles south. An auxiliary gasolene engine of 15 h. p. capacity is also provided and arrangements can be made to operate the bridge by hand in case of necessity.



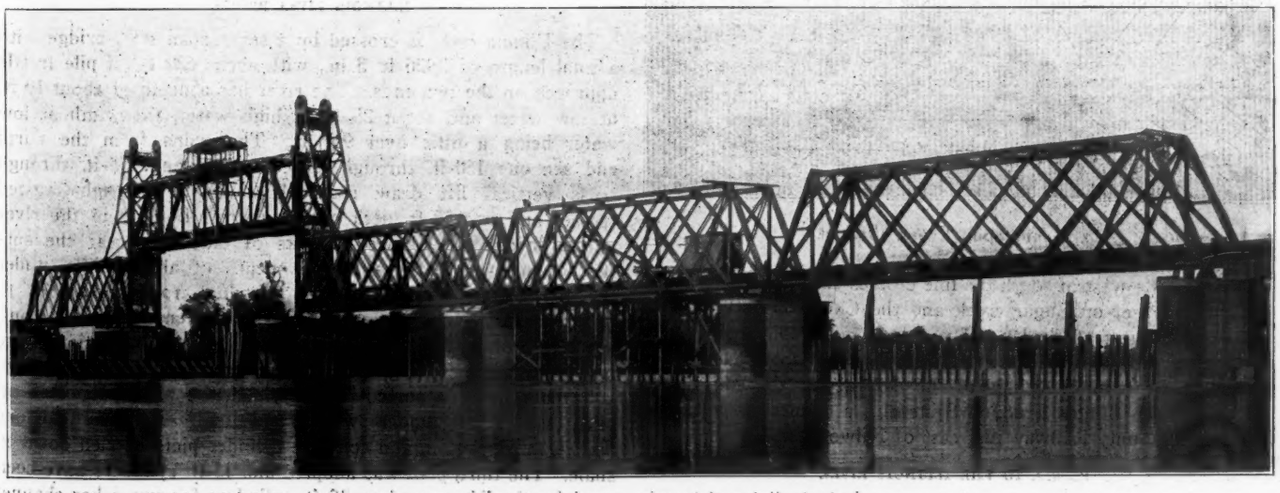
Plan and Elevation of Illinois River Bridge Including Vertical Lift Span



Details of Typical Cylinder Piers for Illinois River Bridge

The superstructure of this bridge was erected from the south end. The two girder spans were erected by a derrick car and the first truss span was erected on falsework by a "mule" car built for that purpose. In order to allow an open channel for navigation during the construction of the lift span, it was necessary to leave out the span between piers four and five until after the completion of the rest of the bridge. As all material had to be brought in from the south end, the steel for the lift span and the two adjacent trusses was brought out to pier five on the completed bridge, lowered to a barge and carried to the desired point to be raised again by the erecting car.

The 150-ft. clear channel is skewed 78 deg. from the center line of the bridge. Pile-protecting fenders about 76 ft. long are provided along the face of the piers and at the ends of these fixed protection piers are four floating booms or fenders having a total length of about 530 ft. These fenders consist of a submerged crib work supporting posts which carry waling strips along the face of the fender. The position of these floating fenders is maintained by anchoring them to clusters of twenty-



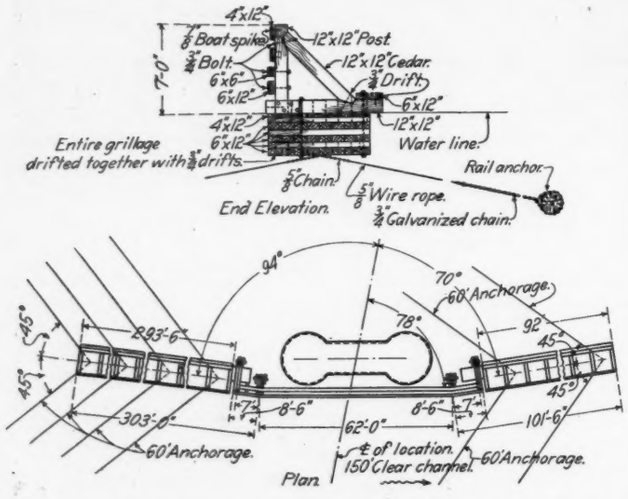
Illinois River Bridge Looking Up-stream from the South Bank

three 60-lb. rails 30 ft. long set in the bed of the river. The connections to these anchorages are 60 ft. long, being made of galvanized chain and steel wire rope. A windlass on the upper surface of the crib work about which the end of the chain is wrapped is used for adjusting the length of the connection. In moving over the total vertical distance of 15.6 ft. between low and high water elevations, the fender makes a horizontal movement of about 7 ft.

Just south of the river crossing the new line goes over the

Lift Span of the Illinois River Bridge in Raised Position, Showing Floating Fender

C. P. & St. L., the grade of the latter being lowered slightly. For the next 27 miles the grinding is very light, the quantities of excavation being particularly low, as it is only necessary occasionally to cut through light prairie swells. The embankments are in most cases only a few feet high to raise the track above the surface of the ground. These long embankments were made



Details of Floating Protection Boom for Lift Span of the Illinois River Bridge

largely from side borrow, all cuts being utilized as far as possible for filling material and in many cases overhaul was allowed.

PEKIN ENGINE TERMINAL

The classification yard and engine terminal is located about four miles south of Pekin. The yard contains 12 tracks 3,800 ft. long, divided into two groups, six northbound and six southbound. The grading for the yard provides for 12 tracks in each group, the groups being located side by side with the space for future development between the two. There is a total track length in the yard of about 15 miles.

The engine house has 20 stalls and is of the company's standard construction of brick on concrete footings. In connection with the roundhouse there is a boiler washout and office building and a 95-ft. turntable. The stalls are 100 ft. long and the pits 75 ft. Two driver and two truck drop pits are provided. The building is heated by hot air supplied through a conduit along the inner circle of the house with a branch for each pair of pits and two lateral openings into each pit. No heating is provided in the house except that in the pits. The smoke jacks are of Transite 36 in. by 18 in. The lighting is by electricity, 32 candle power tungstens being located in pairs on the outer wall between the stalls and covered by lenses which add considerably to their lighting power. A cutout switch is provided for each pair of lights.

In addition to the roundhouse the terminal buildings include a brick powerhouse, a brick store and oil house, a frame lunch room and sleeping quarters for the trainmen, a frame office building and planing mill adjacent to the car repair tracks. The powerhouse contains a machine shop, engine room and boiler room. Three 125-h. p. boilers are provided and space is left for a fourth which can be installed later. The smoke-stack was built by the Alphonse Custodis Co., and is 115 ft. high with an inner diameter of 8 ft. at the top and about 12 ft. at the bottom. Electricity is supplied by two 150 k. w. direct connected gen-

Part of the Engine Terminal at Pekin, Ill.

erators for lighting the buildings and the yard and operating the machinery in the machine shop and planing mill and also for operating the lift span at the river crossing. The transmission line to the river will be steel towers and the power will be transmitted at 6,600 volts. The engine room also contains an air compressor and pump. The boiler washout system is so arranged that one or both of the boiler washing pumps may be connected to the fire line through the buildings and the yard to give 125 lb. pressure on that system. A separate low pressure line is provided for serving the penstocks and the boilers.

The concrete cinder pit extends under two engine tracks. Coal is supplied to engines by a 300-ton elevated mechanical plant of the type built by the Ogle Construction Co. The water supply is secured from a 78-ft. well by a pump having a capacity of 10,000 gal. per hour. A conical bottom steel tank built by the Chicago Bridge & Iron Co., with a capacity of 80,000 gal., provides storage.

FROM PEKIN SOUTH

South of the Pekin yard, the Mackinaw river is crossed on a 130-ft. through truss span, the Chicago & Alton is crossed overhead on one 60-ft. through plate girder span, and a crossing of the Illinois Central is made at grade. Salt creek required one 130-ft. through truss span with an approach fill on the two sides of about 165,000 yd., a portion of which comes from a cut of about 84,000 yd. just north of the creek. The greatest depth of the cut is about 30 ft. and of the fill about 25 ft. With the

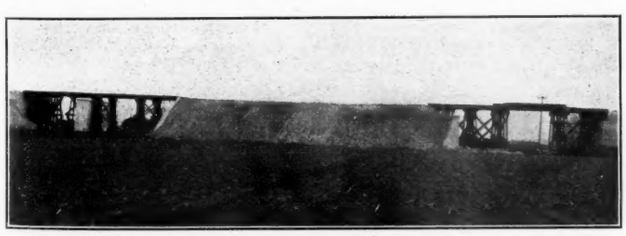
exception of a few small cuts and fills at the crossing of Sugar creek, the work is very light for the 19 miles between Salt creek and Cantrall creek. The latter stream is crossed not far from its confluence with the Sangamon river and about two miles north of the crossing of the latter stream.

The work across the valley of the Sangamon is the heaviest on the line, the quantities in about three miles being approximately balanced at 470,000 yd. One cut about a mile long with a maximum depth of 45 ft. between Cantrall creek and the river contained 370,000 yd. This cut gave some little trouble on ac-

A Cut North of the Sangamon River After a Bad Slide

count of slides and approximately 500,000 yd. of material had to be removed before the work was finished. One of the accompanying illustrations shows the nature of the material which caused these slides. Cantrall creek is crossed about 55 ft. above the bottom of the ravine on a temporary pile trestle bridge and the Sangamon river crossing is made on five 150-ft. deck trusses with pile trestle approaches.

South of the river the country west of Springfield is rolling for several miles, the next work of importance being the crossing of the C. P. & St. L., the Baltimore & Ohio and the Wabash near the town of Curran. The C. P. & St. L. crosses the Wabash at grade just east of this town and the new North Western line crosses both of them overhead just east of the grade crossing. About one mile south of these roads the new line also crosses the Chicago & Alton. As the country on both sides of these lines is very flat and the other roads are laid almost on the surface of the ground, it was necessary to make a fill about



Crossing of the Wabash and the C. P. & St. L. West of Springfield

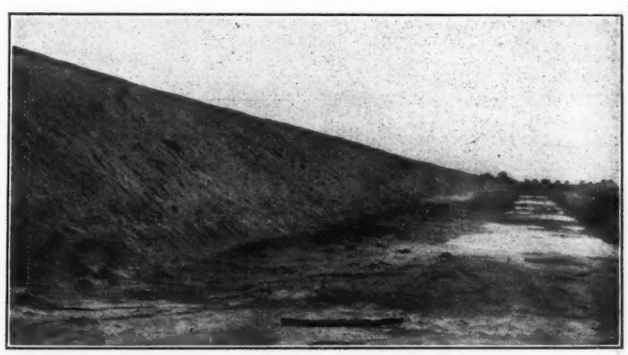
four miles long in order to get the necessary approaches to carry the new line overhead. The maximum height of this fill is about 25 ft., most of the material being secured from side borrow and handled by drag line excavators. Near the south end of this four-mile fill the line crosses Lick creek on a pile trestle. A reservoir has been built along this creek to serve one of the water stations.

South of Lick creek for about 13 miles the line is again laid practically on the surface of the ground, the next work of interest being the crossing of Sugar creek and the Chicago, Burlington & Quincy. The fill carrying the new line over the creek and railroad is about a mile long and has a maximum height of 40 ft. The 60,000 yd. of material required was secured principally from side borrow, the borrow pit being made to serve the purpose of a reservoir along the creek for impounding a water supply for engine use. Some of the material in the fill was hauled from a cut about ¾ mile north. A drag line excavator was used for building the fill and excavating the reservoir, four pockets being dug as deep as the drag line could work. The Bucyrus machine in use had a boom 85 ft. long, making it possible to dig a pocket about 75 ft. wide. The machine worked to a depth about 8 ft. below the creek and about 25 ft. below the track on which it stood. When handling favorable material, 2,000 yd. was a fair day's work, but some hardpan was encountered which required blasting and made the work much slower. It was equipped with a 2½-yd bucket.

In the next few miles south of Sugar creek there are a few light cuts and fills and about 1½ miles north of the end of the line the grade rises to cross the Chicago & Alton and the Illinois Traction System. The approach to this crossing is one of the cases where the temporary 0.7 per cent. grade was used and is the only one in which this grade is ruling. The fill over the Chicago & Alton contains about 300,000 yd. of material.

The water stations on the new line are located from 20 to 25 miles apart, the supply in a few cases being secured from wells and in the other cases from streams, all of which have storage reservoirs, excepting that at the Sangamon river. The reservoir at Lick creek has a capacity of 10,000,000 gal., the one at Sugar creek 10,000,000 and the new one at Macoupin creek on the Macoupin County Railway 25,000,000 gal. Five 70,000-gal. tanks will be provided at these stations on the new line and one on the old Macoupin County line.

The junction with the old line at Peoria and two grade



Big Fill West of Virden, Made from Side Borrow by a Drag Line

crossings with other roads are protected by mechanical interlocking plants installed by the General Railway Signal Company. The plant at the junction has a 16-lever frame, the one at the crossing of the Illinois Central 20 levers, and at the crossing of the C. P. & St. L. 16 levers.

The work of building this new line was started under the direction of E. C. Carter, chief engineer, and after his assignment to valuation work, it was carried out by W. H. Finley, assistant chief engineer, with D. Rounseville as resident engineer. The general contract for culverts, timber bridges and grading was let to Winston Brothers, Minneapolis, and all masonry to the Cleary-White Construction Company, Chicago. The Illinois river bridge substructure was placed by the Missouri Valley Bridge & Iron Company, Kansas City, and the superstructure by the Kelley-Atkinson Construction Company, Chicago. The Frankman Brothers Company, Minneapolis, has the contract for the smaller steel structures, the King Bridge Company fabricating the Illinois river bridge and all structures erected by the Frankman Company. All buildings in the engine terminal were contracted to the C. W. Gindele Company, Chicago. The track was laid by Roberts Brothers in a sub-contract from Winston Brothers. The line was located in 1909 and relocations were run in 1911. Construction work was begun in March, 1912, and was practically completed by the first of October, 1913.

Meeting of the American Railway Association

Adoption of Car-Load Weighing Rules; Action on Standard Time; the Election of H. U. Mudge as President

The spring session of the American Railway Association was held at the Biltmore Hotel, New York City, on Wednesday of this week. Two hundred and forty members were represented by 170 delegates. The Executive Committee reported that the membership now comprises 403 members, operating 272,949 miles, an increase of 1 member and 301 miles.

The associate membership now comprises 159 members, operating 11,000 miles, an increase of 13 members and 1,361 miles.

The Committee on Transportation presented a report in which it submitted questions and answers under the Standard Code of Train Rules and the Standard Detour Agreement, which were duly approved by the association.

The committee also reported that S. G. Strickland, assistant general manager of the Chicago & North Western, and T. J. Foley, general manager of the Illinois Central, have been elected members of the Committee on Transportation, to fill vacancies therein. C. L. Bardo (N. Y., N. H. & H.) has been chosen a member of the Committee on Nominations, in place of J. C. Stuart, deceased. E. D. Brouner (Michigan Central) has been elected a member of the Committee on Maintenance.

The Committee on Maintenance presented a report recommending certain changes in the specifications for carbon steel rails, which were duly approved by the association. The committee also reported that it had arranged to provide for an additional card of the Snellen test letters, making a total of three in all, to be used in testing eye-sight.

The committee reported that from the replies received to its circular it has been found that there is no general demand for a change in the present standard inside dimensions of box cars, and no recommendation was therefore made on this subject. A statement was presented showing the number of cars under 36 feet in length owned by the railroads members of the association as of January 1, 1901, 1909, 1912 and 1914; also a statement of the same dates showing the number of 36 ft. cars owned, and a third statement showing the number of cars over 36 ft., with a supplementary statement showing the classes of cars over 36 ft. long.

On the recommendation of the committee, the following resolutions were ordered to a vote by letter ballot of the association:

Resolved, That the present standard inside dimensions of box cars as adopted by the association on October 23, 1901, viz., 36 ft. in length, 8 ft. 6 in. in width and 8 ft. in height, should be adhered to, except in the construction of special equipment, such as automobile cars.

Resolved, That special equipment should not exceed the inside dimensions of 40 ft. 6 in. in length, 8 ft. 6 in. in width and 9 ft. in height, with maximum outside dimensions of 9 ft. 2 in. in width at 13 ft. above the top of the rail.

Resolved, That the Master Car Builders' Association be requested at the earliest practicable moment to design and adopt a standard frame for closed cars in accordance with the present standard inside dimensions of box cars.

The Joint Committee on Automatic Train Stops reported that it has carefully considered the suggestions and criticisms made to its report at the last session of the association and has also obtained additional information on the subject. In the light of its further investigation and consideration, the committee presented proposed requisites of installation and adjuncts for automatic train control, which were duly approved by the association.

The Committee on Relations between Railroads reported concerning its conferences with the National Industrial Traffic League, and the rules governing the weighing and reweighing of carload freight, as agreed on, and as presented by the committee were duly approved by the association. (Rules printed in *Railway Age Gazette*, May 1, page 986.)

On the recommendation of the Committee on Weighing, a note was added to car service rule 11 providing that the marked weight shall be the multiple of 100 lb., nearest the scale weight, except that when the scale weight indicates an even 50 lb. the lower multiple shall be used.

The committee called attention to the report of the subcommittee on packing, marking and handling of freight, presented as an exhibit to its report, in which it is noted that general supervision over packing and marking of freight is now being exercised by all of the five weighing and inspection bureaus.

On the recommendation of the committee, two plans of stowing eggs in cars were approved by the association, as were certain regulations relative to the preservation of wrecked freight.

The committee reported that the names of the two sub-committees have been changed to "Committee on Weighing" and "Comimttee on Packing, Marking and Handling of Freight." In the case of the latter, its membership will be increased to sixteen. The Freight Claim Association will be requested to nominate five members, each of the five weighing and inspection bureaus will be requested to nominate one member and the American Railway Perishable Freight Association one member. The five other members of the committee will remain as at present. On the recommendation of the committee the Master Car Builders' Association was requested to so reframe its rules of interchange as to provide that cars unsafe to load on account of general worn-out condition, due to age, decay or corrosion, or due to wreck or accident, shall not be offered in interchange, except to a direct connection, which must also be the owner of such car. Corresponding amendments to the per diem rules were adopted.

A resolution was adopted providing for two weights of paper to be used for the interchange report, the main report to be printed on bond paper 14 lb. to the ream of 500 sheets, 17 in. x 28 in., and the sheets which are to be cut up on bond paper, 24 lb. to the ream.

Amendments were adopted to per diem rules 15 and 16, and a note to car service rule 3 (b), providing that "this right does not apply to cars offered home for repairs under the provisions of M. C. B. Rule 2."

On the recommendation of the committee the association resolved

"That when two or more cars chained together, or any cars which require switch chains to handle them, are delivered to connecting lines, the cost of such chains should not be carried as advances on billing." Settlements should be made as required by the M. C. B. rule.

Forms covering shipper's order for empty cars, and a record of such orders to be kept by the railroad company, were adopted as recommended by the committee.

A revised code of switching reclaim rules was also presented by the committee and approved by the association.

The Committee on the Safe Transportation of Explosives and Other Dangerous Articles reported that a hearing had been held at Washington to consider proposed amendments to the regulations and that the Interstate Commerce Commission will probably within a few weeks issue revised regulations.

The committee called attention to the report of the chief inspector (*Railway Age Gazette*, April 3, p. 791) showing that in the transportation and storage of explosives on railway property during the year 1913 no life was lost and only four slight personal injuries occurred. In 1907 incomplete records showed a loss of 52 lives, 80 injuries and a money loss of about a half million dollars.

The Committee on Electrical Working has under consideration the question of third rail working conductor clearances

and clearances for overhead working conductors and overhead crossing for power and other wires.

The Executive Committee reported the appointment of a special committee of presidents on standard freight cars. This action was taken on a petition from ten western railway companies, which said:

With a view to greater economy in maintenance of equipment we have felt for some time past that the adoption of standard freight car equipment was most desirable. . . . We fully realize the difficulties in the way of such a movement, but we believe that by bringing the matter to the attention of the presidents of the roads that its importance will so appeal to them as to give instructions to their subordinate officers that will overcome the obstacles that have heretofore been in the way. . . .

The Executive Committee, deeming this recommendation of great importance and warranting hearty co-operation, decided to appoint a special committee; it will also instruct the Committee on Maintenance to assist that committee. The special committee consists of:

E. P. Ripley, President, Atchison, Topeka & Santa Fe; Fairfax Harrison, President, Southern; Samuel Rea, President, Pennsylvania; A. H. Smith, President, New York Central; J. Kruttschnitt, Chairman of the Executive Committee, Southern Pacific; Darius Miller, President, Chicago, Burlington & Quincy; Howard Elliott, Chairman of the Board, New York, New Haven & Hartford.

The Executive Committee in its report called attention to the fact that pressure is being brought to bear from certain directions on the railways in Ohio to change their standard to Eastern time, both for their time tables and for their offices, shops and freight houses. The association has a peculiar interest in this subject, as it was through the elements from which it was organized—the General Time Convention and the Southern Time Convention—that the reform in time-keeping was brought about in 1883. By the agreement made in that year all the railroads in the State of Ohio adopted Central Standard time, and with very minor exceptions both railroad and local times have been uniform throughout that state and vicinity to the present time. Central time was also declared to be the standard of the whole state by a law passed by the Ohio legislature in 1893. The city of Cleveland by ordinance has now made Eastern time the standard of that city. Persistent and partially successful efforts have been made and are being made to induce the railroads to make the same change, and eventually to secure the adoption of Eastern time for the entire state of Ohio. Great confusion in time-keeping within the state of Ohio will result if those efforts should attain success, and, says the committee, "individual roads or communities ought not to pursue a course which may be detrimental to other railway or other public interests, without conference and careful consideration being given to the effect upon those interests."

On recommendation of the executive committee the president appointed a committee on this subject to report at the November meeting of the association. In the meantime, all members of the association whose lines are located in the section assigned in 1883 to Central time are "earnestly requested to abstain from the use of Eastern time until the report of this committee shall have been presented and finally acted upon."

The committee is as follows:

E. B. Thomas, President, Lehigh Valley; B. McKeen, General Manager, Pennsylvania Lines West; C. W. Galloway, General Manager, Baltimore & Ohio; H. A. Worcester, General Manager, Cleveland, Cincinnati, Chicago & St. Louis; D. C. Moon, General Manager, Lake Shore & Michigan Southern; A. W. Johnston, General Manager, New York, Chicago & St. Louis; A. J. Stone, General Manager, Erie; M. S. Connors, General Manager, Hocking Valley; H. W. McMaster, General Manager, Wheeling & Lake Erie.

The election of officers resulted as follows: H. U. Mudge (C. R. I. & P.), president for two years; R. H. Aishton (C. & N. W.), first vice-president; and H. E. Byram (C. B. & Q.) and George L. Peck (Pennsylvania Lines), members of the executive committee.

The following companies were elected members of the committee on transportation: Chesapeake & Ohio; Chicago, Burlington & Quincy; Illinois Central.

The following were elected members of the committee on maintenance: Baltimore & Ohio; Erie; Michigan Central.

The following were elected members of the committee on relations between railroads: Chicago & Eastern Illinois; Grand Trunk; Pennsylvania.

Messrs. Benj. McKeen, A. C. Needles and G. W. Taylor were elected members of the committee on nominations.

It was decided to hold the next regular session in Chicago, on November 18, 1914.

JUGGLING WITH STANDARD TIME

[From The Official Guide]

The authorities of the city of Cleveland and of several other cities in Ohio having about the same longitude have recently attempted to change their official standard of time from central time, as prescribed by Ohio state law, to eastern time. The specious reason given for this change has been the cry of "more daylight," and the city fathers are posing as successors of Joshua, who made the sun stand still. The new ordinance, by influencing the closing of offices, stores and factories an hour earlier than before by clocks run by eastern time, ostensibly adds an hour of daylight to the close of the day. At this season of the year and in the summer this is an apparently pleasant change, which might, however, easily have been effected any time in the last 30 years, by closing offices at four o'clock, central time, instead of five o'clock. This is exactly what the new ordinance actually does, though it purports to do something else, and, equally, as a matter of fact, it is intended to get men and women to start to work at seven in the morning by making them think it is eight.

Certain unwelcome features of the change will inevitably appear later in the year. The effect will be that those who go to their work when the hands of the clocks set by eastern time point to eight o'clock will be obliged to breakfast by artificial light the greater part of the season between November and April. If the people of Cleveland have found that the use of central standard time seemed inconvenient, it would have been a very simple matter for them to change the hours of opening and closing their shops 30 minutes, and, instead of running from eight o'clock to five o'clock, run from seven-thirty to four-thirty. That would have been the honest way to meet the condition, and it has been so met successfully in many locations. Such an adaptation of the working day would have brought them almost exactly in accord with the mean solar time of the meridian of Cleveland, and would not have tended to disintegrate the general plan of uniform standard time which has been in effect for the past 30 years. Those who are old enough to remember the inconveniences which resulted from the isolated individualism prevailing prior to 1883 will hesitate to approve any steps that tend backward toward the confusion of those days.

It is a libel upon the intelligence of the citizens of Cleveland to suppose that in order to persuade them to rise at, say, five or six o'clock instead of six or seven they are so feeble-minded that they have to be cheated into that action by setting the hands of the clocks one hour ahead, so as to make them think they are still rising at the same hour as before. Are they of such a hidebound conservatism that they cannot rise unless the hands of the clock point to the accustomed hour? If the proposed movement should meet with its greatest possible success, it would mean that in place of the uniform time that is now used by railways and cities alike throughout the whole state of Ohio, there would be, inevitably, numerous points where two different standards of time would be in use in that state, with resulting inconvenience and confusion. These annoyances have been minimized at the present points of change, only two of which are in Ohio, by an experience with them of over 30 years, especially as similar difference in time had always existed at these points. Their introduction would be intolerable at points where uniform time is now in use.

International Railway Fuel Association Convention

Coal Storage and Sizing, Performance Records, Feed Water Heaters, Air Openings in Ash Pans, etc.

The sixth annual meeting of the International Railway Fuel Association was held in Chicago, May 18 to 21, Robert Collett, formerly of the St. Louis & San Francisco, presiding. The convention was opened with a prayer by Dr. T. F. Dornblaser.

PRESIDENT'S ADDRESS

President Collett, in considering the future work of the association, said: Recent improvements in mining machinery, especially along the lines of electrical equipment, are giving us coal better prepared on the car. Some improvement has been made in handling through chutes to secure more uniform fuel on locomotive tenders. We need to specialize more in this direction, and in arriving at the amount of fuel delivered to each locomotive. Improvements have also been made by the addition of superheaters, mechanical stokers and other locomotive appliances that either reduce labor or save fuel. Any permanent progress along the lines of improved drafting, or for increasing the feed-water temperature before reaching the locomotive boiler, or other devices that will result in causing the position of the locomotive crew to be more attractive, will justify themselves. Recent developments in car design, and in the air brake, have made it possible to handle very large trains. The physical ability of the fireman, however, imposes certain limitations on the speed and tonnage, and we would suggest that your committee reports on "Firing Practice" include the progress of the mechanical stoker, considering especially its adaptability for handling low grade fuel.

The proper use of fuel on railroads depends also on other factors: Fuels should be properly prepared for delivery to the engine tender, and a uniform grade of fuel should be supplied where possible. It is fair to assume, where coal mines exist on railroads, that such coal will be used on its locomotives; first, because of lower cost and a constant supply, and second, to stimulate the industry. Efforts should be made to learn to use such coals, rather than criticize the quality, as the source cannot be altered. Every semblance of waste should be avoided from the time the coal leaves the mine until it reaches the locomotive tender, otherwise there is not the incentive for the engineer and fireman to exert their best efforts. If railway managers are shown, concretely, what it costs to operate locomotives not in good condition, the locomotive will not be permitted to long remain in this condition. The proper distribution of engines to divisions to secure the best results, the correct loading of cars and trains, and train movement, should be carefully studied from the standpoint of fuel cost, quite as much as from any other angle. The make-up and schedule of trains is important; it is all along the line of co-operation, and needs emphasis.

The plans and specifications for the construction of the modern locomotives are worked out to the minutest detail, and when completed it is a magnificent machine. But there lies more opportunity in the finished education of those who are to care for and operate this machine, and not they only, but all whose line of duty affects fuel costs, than was ever known to the builder's art.

This is an age of co-operation. We are fast learning the lesson that difference of occupation does not imply necessary hostility, and that if we want good service we should cultivate a just pride in duty well done, and should make working conditions as comfortable, and above all as regular, as possible; in other words, cause each employee to be in love with his work. Generally speaking this is not a difficult problem. Considerable personal observation has convinced me that the average railroad employee desires to do his work in the most efficient manner, but it frequently occurs that he has never had the proper instruction to start him right; under which circumstances a willing man is liable to fail, and I believe this will apply to other occupations.

ADDRESS OF DR. GOSS

Dr. W. F. M. Goss gave an interesting talk on the significance of a pound of coal by telling what work it could perform in locomotive service, and showing its position in the country's production. In a first class stationary power plant one pound of coal will sustain one horse power for one hour, while in a locomotive of the most modern type it will sustain the same work for only 20 or 25 minutes. In a modern freight locomotive it will carry one ton 15 or 16 miles, and a modern train will require one pound of coal every 52 ft. it travels, having once got under way. If the annual production of the coal in the United States, 600,000,000 tons, were made into cubes of one pound each, and these cubes placed end to end, they would extend for 500,000,000 miles or about 20,000 times around the world.

In the past the coal production of the United States has been doubling every ten years, and if this rate continues until 1920 the total production between 1910 and 1920 will equal the total production in this country prior to 1910. This gives a very vivid illustration of the importance of the fuel question.

In speaking of the work of the committee on Investigation of Smoke Abatement and Electrification of Railway Terminals, of the Chicago Association of Commerce, Dr. Goss stated that the railways in and about Chicago, which are under the jurisdiction of the City Smoke Inspection Bureau of Chicago, are to be congratulated on the wonderful progress they have made toward eliminating locomotive smoke. While locomotives made more smoke in proportion to the amount of coal burned, they make only 20 per cent. of that produced by all fuel consumers.

He stated that of 17,500,000 tons of coal consumed in the Chicago city limits per year a little less than 2,000,000 tons are used by locomotives, more than 4,000,000 tons by manufacturers, about 4,000,000 tons for heating, and 7,500,000 tons for high pressure steam boilers. Dr. Goss closed his remarks with the admonition that "If you take care of the pounds the tons will take care of themselves."

HONEYCOMB AND CLINKER FORMATION

By S. W. Parr

Professor of Applied Chemistry, University of Illinois

The following conclusions were drawn from an extensive study of this subject:

The term "honeycombing" itself is somewhat of an explanation of the chemical processes which are going on. Particles of coal which are fine enough to be caught up by the draft have, in the short distance they may travel, about the right conditions as to temperature, oxygen supply and the time element, to bring them to this intermediate or easily fusible stage. They are thrown, therefore, against the flue sheet in a semi-pasty condition.

First, the chemical condition, which seems to be most conducive to formation of honeycomb, is the one in which the percentage of iron pyrites is high.

Second, any conditions in the combustion chamber which by reason of the time interval for complete oxidation, or temperature stages, or deficiency in oxygen, which would promote the formation for any brief length of time of the iron pyrites in the ferrous sulphide stage, is a condition likely to promote clinkering.

Third, the physical condition most active in promoting the formation of clinkering of particles in the firebox above the

grates is found in the finely divided material, which is both high in ash and high in iron pyrites.

Fourth, at least one practical suggestion is indicated, namely, that so far as is possible the fine stuff be eliminated from the material as fired. Material of this sort may be much more readily handled in fires which are not conducted under such forced conditions as to draft and speed of combustion, it being only necessary to give ample access of oxygen until the time of complete burning out of the sulphur, after which the tendency to fuse is reduced to the minimum.

DISCUSSION

The one prominent point brought out in the extensive discussion on this subject was that in almost every case the honeycombing of the flue sheets was almost entirely eliminated by allowing more air to pass through the grates. In other words, opportunity for more complete combustion was provided; more oxygen was introduced into the fire-box. This is directly in line with the paper itself, and would seem to substantiate the theoretical discussion of the author. No cases of honey-combing were mentioned where brick arches were used, although the same engines gave trouble from this cause before the arch was installed. In addition to the requirements for more air through the grates, the necessity of proper firing was declared necessary. With leaking flues, roughened projections in the fire-box, and boilers badly scaled, honey-combing is more apt to take place, and when once started will augment at a rapid rate.

With regard to eliminating the "fine stuff" mentioned in the fourth conclusion it was believed that more progress would be made by learning to handle properly the grades of coal offered.

FRONT END DESIGN AND AIR OPENINGS OF GRATES AND ASH-PANS

By M. C. M. Hatch

Superintendent Fuel Service, Delaware, Lackawanna & Western.

The locomotive front-end, reduced to its simplest terms, is an apparatus for providing draft at the fire. It is a vacuum pump drawing air and gases through the ash-pan, grate, fuel-bed, firebox and tubes, discharging through the stack, and with the exhaust steam jet from the engine cylinders as its source of power. This pump must be capable of creating and maintaining high vacuums. An engine, recently under test at Altoona, showed a maximum smoke-box vacuum of 19.6 in. of water, equivalent to 11.32 oz. This high locomotive draft was measured in front of the diaphragm; behind it the draft had fallen to 10.2 in., a drop of 48 per cent.; and in the fire, to 3.7 in., a reduction of 81 per cent. This indicates that but 19 per cent. of the total draft furnished by the front-end vacuum pump was actually active at the fire. Excessively long tubes will obviously cause greater differences in the draft head between the tube sheets than will shorter tubes of the same or even less diameter. On an Atlantic type locomotive with 2 in. tubes, 13 ft. 8⅝ in. long, 6 in. of draft back of the diaphragm sustained a fuel rate of 100 lb. of coal per square foot of grate per hour, while on a Pacific type with 21 ft. tubes, 2¼ in. diameter, the same draft burned but 88 lb. of coal. These figures indicate what is to be expected when tubes are made very long. From a careful consideration of all the data at hand I am led to believe that the ratio of tube diameter to length should be not less than 1 to 110, and that better results will be obtained from large boilers by the introduction of combustion chambers in place of the use of tubes much over 18 ft. in length.

Front-ends must have consideration as spark-arresters, or more properly, spark-killers, as they should be self-cleaning. This means that they must be provided with an ample area of netting or perforated plate, the openings in which will control the maximum size of sparks emitted. They must be designed to give an equalization of draft through the boiler tubes, and over the entire surface of the fire.

The shape of the exhaust nozzle seems to play some part in the efficiency of the front-end as a draft producer. Nozzles have been made square, oval, rectangular, star-shaped, annular, etc., with varying results, but the general practice still clings to the familiar circular shape, either double or single, with the preference for the latter. One tendency of the average engine house force in regard to nozzles should be discouraged, and that is their immediate desire to reduce the size when an engineer reports "engine not steaming." Closing up the nozzle should be a last resort, not to be permitted until all else has been tried and found ineffectual. If the opening must ultimately be reduced, bridges or splits should not be used; bush or change the tip, but leave a free opening for the exhaust jet.

All else being equal, the spark discharge is a function of the rate of combustion which is, again, dependent upon draft intensity. If we must burn 120 lb. of average bituminous coal per square foot of grate per hour, we will have a draft, at the fire, of not far from 3 in. of water. A negative pressure of this degree will, no matter how created, cause small particles of fuel to be carried off from the fuel bed and, in the restricted space of the locomotive firebox, these will not be consumed, but will enter the tubes, be discharged into the front end, and thence from the stack. The amount of solid matter discharged from the stack is large and the quantity and fuel value of this loss as ascertained by some recent investigations has been found to vary from 2 per cent. and 1 per cent., respectively, at a rate of 2,000 lb. of dry coal fired per hour, to 14 and 12 per cent., respectively, at a rate of 7,000 lb.

Grates.—There are mechanical considerations which will limit the air openings in the grates and these, rather than those of proper combustion, will govern. In the absence of absolute figures covering this matter, it is believed that the principles of efficient combustion will be best served if the percentage of air openings be made as large as possible without causing losses of fuel through the grate. As to the form of the grate bars, whether finger or table, both are used with success and both have their adherents. Experience with both types indicates that, for average bituminous coals and under average working conditions, a well designed finger grate, properly applied, will give the best general service.

Ash-pan.—The proper theory of ash-pan air opening can be enunciated in a few words, as follows: Air ingress openings in the ash-pans should be of sufficient area to ensure the presence of atmospheric pressure under the fire when the grate is working at its maximum fuel rate. The standard practice card of one locomotive builder reads: "The total unobstructed air openings in the ash-pan need not exceed the total tube area, nor must they be less than 75 per cent. of total tube area." One of the largest railroads, which has gone into matters of this sort deeper than any other, has established a standard ash-pan opening of not less than 14 per cent. of the grate area. Prof. W. F. M. Goss concludes, from data gathered at the locomotive test plant at St. Louis, that "It is evident that after a relation of 0.14 sq. ft. of air inlet per square foot of grate was reached, no further decrease of draft occurred, when the air inlets were increased, and when the air inlets were less than 0.11 sq. ft. per square foot of grate, the draft necessary to supply air increased very rapidly."

Consider an engine with a grate area of 65.8 sq. ft. and a tube fire area of 8.73 sq. ft. The maximum of Prof. Goss, shown to give best results, exceeds the minimum allowance of the builder by 29 per cent. In other words, modern engines working with an ash-pan air ingress opening equal to 75 per cent. of the tube area have but 0.7 as much as they should have, according to what are at present our most reliable data.

An engine with 65.8 sq. ft. of grate area had 9.2 sq. ft. of ash-pan air inlet, equivalent to 14 per cent. of the grate area

and, under heavy test conditions, when consuming 130 lb. of coal per square foot of grate per hour with a firebox draft of 3.2 in. had but 0.3 in. draft in ash-pan. A second engine, tested at St. Louis, had a total tube fire area of 6.51 sq. ft., a grate area of 49.9 sq. ft., and ash-pan air inlets of 4.95 sq. ft., equivalent to 74.5 per cent. of the tube area and 9.72 per cent. of the grate area. This engine, under about the same test conditions as the first, showed, while at a fuel rate of 116.25 lb. of coal, a vacuum in the ash-pan of 0.64 in. with 2.22 in. in the firebox.

To recapitulate, what general conclusions can be drawn from the foregoing? Briefly, let us design the front-end so that it shall be as efficient a vacuum pump as possible; let us get the boiler tube ratios right; let us admit plenty of air, well distributed, through the grates, and let us open up the ash-pans so that the front-end pump does not have to work against added restrictions there. If we follow these practices, we shall make progress. Fuel economy, from the standpoint of design, means the use of a boiler and furnace which will take out the greatest possible amount of heat (perfect combustion) from the coal, at the expenditure of the least possible amount of energy.

All my investigations show that the amount of definite and authoritative information on the subjects under consideration is amazingly small. We *should* and *must know* more about these matters and this association should undertake the work of investigation, and at once. I, therefore, suggest that we, as an association, bespeak the aid of the Pennsylvania Railroad, Purdue University, and the University of Illinois, requesting them to collaborate with a committee, to be appointed by this association, with a view to determining and finally enunciating what, for modern practice, should most efficiently govern the design of the details we have just considered.

DISCUSSION

Issue was taken with the author of the paper on the elimination of the bridge in the nozzle. Where the exhaust does not fill the stack it was believed that the use of the bridge was imperative. G. E. Sisco, of the Pennsylvania, spoke of some stationary tests made by that road in which it was shown that the elliptical nozzle was much more efficient than the round or rectangular nozzle, quoting as the results of the tests the following:

Nozzle	Draft in front of diaphragm	Evaporation per hour
Round	10.2 in.	43,702 lb.
Rectangular	14.6 in.	49,284 lb.
Elliptical	19.6 in.	58,882 lb.

The Pennsylvania is making road tests with a new type of nozzle, which has given excellent results in stationary tests. It is round with four radial arms extending in toward the center for certain fixed distances. The cross section of these arms is in the shape of a triangle, with the apex extending downward.

Numerous cases were mentioned where much relief had been obtained by increasing the air opening in the ash pans. Attention was also called to the fact that the results of tests on locomotive draft were very different in a test plant than on the road on account of the wind action at the ash pan.

UNIFORM METHODS OF COMPUTING FUEL CONSUMPTION

C. F. Ludington, chief fuel supervisor of the Atchison, Topeka & Santa Fe, read a paper on "Uniform Methods of Computing Fuel Consumption." He said in part: Accounting systems may be uniform, but comparisons between railways decidedly unfavorable, due to vast differences in operating conditions, the principal ones being mountainous railways compared with railways operating in water level country; single track railways operating through sparsely settled country, as compared with double track railways in more congested centers; kind of power used, and quality of coal available in the different localities. We may, therefore, adopt uniform methods of records, but cannot expect uniform comparisons.

Over one hundred million tons of coal are consumed annually by locomotives on the various railways of the United States. This vast expenditure for locomotive fuel results in the largest single item of expense in conducting transportation. Notwithstanding this fact the system of accounting for this expenditure by the majority of the railways in the country is given only secondary consideration. In view of the fact that thousands of railway employees are concerned and directly responsible for the excessive use of fuel, additional supervision should be given this important subject.

Where such departments have been organized they have brought to light entirely unsuspected leaks and have been able to institute economies in unthought of directions that much more than pay their cost of maintenance. In advocating a system of fuel accounting I am very much in favor of the plan whereby daily accounts are maintained, enabling the fuel department to intelligently supervise the excessive consumption of fuel by individual trips, not to exceed three or four days after the performance is made.

The Santa Fe has adopted the plan of figuring fuel performance from the Train Despatcher's Daily Train Tally Sheet, the information being taken direct from the train sheet. The fuel department of the Santa Fe was organized July 1, 1908, at which time it took over the accounting for the fuel from the time it was purchased to the time it was actually disbursed or charged to operating accounts, as well as physical handling of the fuel from car to chute and from chute to locomotive at fuel stations. The following percentages cover increase in volume of business handled, representing ton miles for freight and passenger road service, per cent. of increase in actual consumption of fuel during the same period and the per cent. of decrease in pounds of fuel consumed per 1,000 gross ton miles for the fiscal year ending June 30, 1913, as compared with the same period ending June 30, 1909:

Ton miles	Increase 35.7 per cent.
Fuel consumed	Increase 16.7 per cent.
Pounds of fuel per 1,000 gross ton miles	Decrease 13.9 per cent.

This represents practically 14 per cent. more efficiency for each ton of coal used and when taking into consideration the annual expenditure of over $9,000,000 for fuel for locomotives, it can be readily seen what effect the decreased consumption had in reducing operating costs. It is not the intent to convey the idea that our daily accounting system and the close supervision was entirely responsible for the entire decrease shown. On the contrary, we are willing to admit a large portion of the decrease was due to other causes, the principal ones being larger power, double-tracking, reduction of grades and numerous fuel saving devices, the most prominent of which and deserving of special mention being the brick arch and the superheaters. Still further decreases are being made monthly over the same months of the previous year, and for the first eight months of the fiscal year which ends in June, 1914, we have still further decreased fuel consumption $229,012.01, representing a monthly saving on the ton-mile basis of approximately $29,000. This decrease in fuel consumption has been brought about largely by interesting the individual enginemen in the question of fuel economy through continual agitation by daily and monthly performance records and by personal contact of traveling fuel inspectors and road foremen of engines in an educational way.

There are numerous advantages in daily accounting and records of trip performance, for in addition to keeping the subject continually before the men, it also brings out mechanical defects in the engine with the least possible delay, enabling the mechanical department to keep engines in better condition, resulting in fewer failures and decreased fuel consumption.

The present practice of coaling engines on most railways is responsible for a great deal of carelessness about saving fuel. When there is no method of telling how much coal has been issued or no effort made to obtain accurate issues, it is not human nature to expect that the enginemen or others

will show very much care in its use. If it is thrown on wholesale the tendency is to use it wholesale, while, on the other hand, if coal is weighed when put on tenders or even measured with any degree of accuracy, being particular to see that in no case is the engine overcharged for coal taken, the interest displayed will soon reflect on the users of the fuel. The Santa Fe has 36 mechanical weighing plants and is displacing all old style shovel and gravity chutes with modern plants of this kind as fast as possible.

The fuel is contracted for and purchased by the general purchasing agent and loaded and weighed under the supervision of fuel inspectors located at the mines, who report direct to him. These men have the authority to refuse the fuel loaded if in their opinion it does not meet the specifications. The cars when loaded are shown as forwarded on the report made by the station agent at mine stations, or connecting line stations, as the case may be, in triplicate, one copy being sent to the mines as a receipt, one copy to the general purchasing agent as a basis for the invoice, and the third copy to the chief fuel supervisor for checking against station report of cars received and unloaded. The cars are forwarded by the station agent at the mines in accordance with the directions of the division superintendent who handles the distribution of coal from mines to fuel stations.

In conclusion a few of the principal advantages obtained by use of a daily accounting system, which reflects directly on operating costs, are:

Increased supervision over trip performances resulting in interesting the individual in economical use of fuel.

Better power condition by being able to stop the steam leaks causing excessive consumption of fuel in five or six days instead of as many weeks.

Reduction of engine failures.

Better train loading.

Better train despatching, enabling trains to get over the road with minimum delay; this means reduction in overtime paid enginemen and trainmen and improved working conditions.

Reduction of terminal delays, both as to engines and trains.

DISCUSSION

Several members agreed with the author that even though uniform accounting systems were adopted it would be impractical to compare two railroads, or even two divisions, on account of different operating conditions.

The purpose of keeping records is to locate inefficient handling and loss of coal. Daily performance sheets are not only valuable on account of creating interest among engine crews, but provide a basis on which to start investigations. They also tend to keep locomotives in better condition, as enginemen in endeavoring to keep up to standard will report defects in locomotives and call them to the attention of the authorities if they are not corrected. They also provide a means of checking up distribution of fuel, especially in cases where enginemen fail to leave coaling tickets at coaling stations. From experience of roads using this system it is believed that the expense is fully justified by the results obtained. By keeping careful check on coal shortages are very materially decreased. Discussion led to talk on fuel economy in general and the practice of giving bonuses to engine crews performing extraordinarily good work was believed to be unfair to others. By giving engine crews individual attention better results can be obtained than by simply calling them to account for poor service, as in the first case the cause of poor service may be easily remedied while in second case it is more than likely to be augmented.

STORAGE OF COAL

By C. G. Hall
Fuel Agent, Chicago & Eastern Illinois

This paper proposes to discuss only the storage of bituminous coal, and as each coal field of the world has internal and external conditions peculiar to itself, that part relative to market conditions and sizes of coals, will be directly applicable only to the coal districts of Indiana and Illinois, adjacent to the city of Chicago.

It is patent to any one, even slightly familiar with the coal industry, that the physical producing capacity, of the bituminous mines of this country, is far in excess of the amount of coal consumed. This condition has largely been the outgrowth of labor troubles, starting with the last protracted strike in the anthracite field. The carriers have contributed somewhat to the overproduction by building lines into new fields and making lower rates on long hauls, moving coal beyond the economical zones and pouring it into the already flooded markets.

Think of the enormous needless capital investment required to open up and maintain mines with a physical capacity 150 per cent. greater than the normal consumption. Also consider the extra expense incurred by carriers in serving the excessive number of mines and the capital that would be required for equipment to provide them with 100 per cent. car service in event of an abnormal demand being created which would permit the mines to run full time for even a short period. The storage of coal in the summer months will enable the carriers to move a percentage of the tonnage during that season, which they are now called upon to move during 60 or 80 days of each fall and early winter, and during which period no railroad in this country now has, or ever can afford to have, sufficient power and cars to serve the mines and move the coal to accord with the demand. To do this, we will say five of the large coal moving roads of Illinois and Indiana would each have to buy fifty new locomotives and 6,000 new coal cars.

A total of 250 locomotives at $25,000	$6,750,000
A total of 30,000 cars at $800	24,000,000
Total investment of	$30,750,000

the annual interest on which, at 5 per cent., would amount to $1,537,500, and a greater percentage of such cars and power would be idle eight months of the year. This is only a small portion of the total investment that even this small group of railroads would have to make in order to handle the coal as the consumers now demand, as the expense of additional double and triple tracks and yard facilities would far exceed the cost of additional equipment and power. This of course would mean an increase in the ultimate delivered cost of the coal.

The only curb on the excessive production has been the inability of carriers to provide and move sufficient equipment to give the mines full running time and the further curtailment which has resulted from the miners demanding and securing a shorter working day.

There is no question but what some feasible arrangement will have to be made for storing bituminous coal, as an industry of the magnitude of the coal operations of Indiana and Illinois alone cannot hope to continue to exist and compete in this economical age on the basis on which it now exists. Some means will have to be provided to enable the mines to operate 300 days a year instead of 175 to 225 days, as now obtains. The storage of coal, by the domestic users, the dealers, the industrial plants and the railroads, will give the mines fairly equal running time throughout the year, making coal one of the staple products of the country, as it should be.

The producer has in the past, and will in the future unquestionably make sufficient price concessions during the spring and summer months to cause that to be an attractive feature of storage. The carriers should also offer inducements in the nature of freight rates with "storage in transit" privileges and should make lower rates during the months that it is to the advantage of all interests to store coal. The total operating expenses of the railroads moving the Illinois and Indiana coal to Chicago and the adjacent territory north and west show an increase of 31 per cent. in proportion to gross earnings in a severe winter month as compared with a spring or summer month. It is therefore entirely fair, and in fact a sound business proposition for these carriers to make a corresponding variation in freight rates. For example the present rate to a given point is $1 per ton—why should not a rate of 85 cents be made for the months

of April, May and June; 95 cents for July, August and September, and $1.10 for the remaining months of the year?

In event of coal being put into storage during the spring or summer months, at a point like Chicago, for instance, and then reloaded and forwarded to a final destination in the fall and winter, the freight tariffs could provide for a rate from mines to storage yards equal to the proportionate rate to Chicago at the time the coal moved. The lines handling the coal to destination could put in tariffs from Chicago storage piles to points beyond based upon the proportionate rates beyond, so that the storage company would get the benefit of the reduced summer rates from mines to Chicago and would pay the prevailing proportionate rate beyond at the time coal moved out of storage.

While unquestionably the best and most economical results can be obtained by moving the coal to its final destination before storing, it may be desirable and necessary to establish storage yards at principal distributing centers such as Chicago, Peoria, St. Paul and Omaha, and in doing this the co-operation of producers and carriers will be essential. In fact, it would probably be feasible and desirable for the producers to control the storage companies.

STORAGE BY RAILROADS

The railroads, as consumers of approximately 25 per cent. of all the coal produced, are vitally interested in perfecting arrangements for the systematic storage of coal each year. Beyond their interest as a consumer they are also deeply involved in the coal industry as a carrier, and the storage of coal at the proper seasons will fit into the operations of the carriers so that not only will they be able to amply protect the movement of coal with the equipment now in service, but they will be in position to deliver it at a lower cost than if they are compelled to provide equipment and facilities to meet the fitful movement that has prevailed in the past.

In storing coal the railroads should plan, so far as practicable, to move it to final destination before unloading, to save the use of cars at the time when the coal is to be used. To do this most effectively the coal should be stored at the coaling stations and arrangements should be made to recover it without involving the use of any cars whatever. A storage plant to handle 20,000 tons by the use of bridge and traveling clam bucket would not exceed $10,000, and in combatting the argument that this cost would be prohibitive, I submit the following:

A coaling station, handling 300 tons daily, located 150 miles from the mines or the delivery point of connecting line, will require as a minimum 45 coal cars to provide a safe working supply of coal. At a time when the demand for coal is great each car is worth more than $2 a day, but in this instance we will say $2 a day. Forty-five cars at $2 equals $90 per day, and for 60 days (which is about the average period of the fall rush for coal) it would amount to $5,400, repaying the company for the storage layout in two seasons. The forty-five coal cars would represent an investment of approximately $35,000, so the question of interest on the investment is all in favor of the storage facilities. In addition the railroad would secure the benefit of the reduced expense of moving the coal during the dull period of the summer and avoid to some extent the congestion which prevails in the fall, due to the heavy movement of grain and the abnormal movement of coal. As the distance from the coaling stations to the source of supply increases, so does also the amount of the saving resulting from the storage of coal increase.

There is still another factor, i. e., at the time the railroads are storing the coal, which should be either egg or lump, the mines are producing nut and slack (representing from 38 per cent to 60 per cent. of the volume of coal stored) for the commercial market, giving the railroads this additional tonnage at a time when they need the traffic and can move it at the lowest cost.

In the absence of sufficient space, adjoining coaling docks already installed or to be constructed, to permit of such a storage arrangement as has just been described, we would recommend the use of locomotive cranes with tracks. The storage ground to be located as near the coaling station as practicable, taking all conditions into consideration, such as accessibility for switching, protection from theft, etc.

The expense of unloading and reloading is very reasonable. Following shows actual expense of one road for unloading and reloading coal at three different stations during winter and spring of 1912:

UNLOADING

Station	Tons	Labor	Avg. cost labor	Supplies	Track	Total cost	Total average
"G".....	9,870	$293.23	.0297	$27.10	$179.27	$499.60	.0506
"H".....	9,396	285.31	.0304	.....	.....	285.31	.0304
"T".....	7,373	175.76	.0238	.....	198.77	374.53	.0508
	26,639	$754.30	.0283	$27.10	$378.04	$1,159.44	.0435

RELOADING

Labor	Average	Supplies	Total	Total average	Total cost of handling: Cost	Total cost of handling: Average
$219.87	.0223	.....	$219.87	.0223	$719.47	.0729
203.41	.0216	.....	203.41	.0216	488.72	.0520
30.00	.0040	.....	30.00	.0040	404.53	.0549
$453.28	.0159	.....	$453.28	.0159	$1,612.72	.0604

Advice from a southwestern road shows that during the past fall they reloaded into cars coal from storage piles by means of locomotive cranes, at a labor cost of only 1 cent per ton.

Contrary to the common belief, coal does not suffer serious losses when exposed to the elements. Exhaustive tests and researches have been made by the University of Illinois and the Bureau of Mines, and the bulletins issued indicate that the calorific loss on coal exposed to the open air for one year or more is not sufficiently great to make the storage of coal prohibitive.

The disintegration of coal is a greater obstacle to storage than the losses in heat value, as there is no question but that the bituminous coals of this country will slack badly when exposed to the elements six weeks or more. This makes the rescreening plant a necessity where coal is stored in large units and subsequently recovered for the market. The ability of railroads and other steam users to procure for storage sizes larger than they ordinarily use, enables them to recover the coal in a satisfactory state for their purposes without rescreening.

If central storage yards are established and operated successfully it will undoubtedly open up a field for briquetting plants, thereby enabling storage companies to rescreen the coal, making all standard sizes, and utilize the slack for domestic or steam purposes by making it into briquettes.

When coal is stored in large units great care is required to avoid spontaneous heating. A recent Bulletin of the University of Illinois contains an extensive and complete report, prepared by Professor S. W. Parr and F. W. Kressman, of the results of their experiments and investigation of the question of spontaneous combustion of coal, and all who are interested in this subject should secure a copy of this bulletin. Their enumeration of preventive or precautionary measures to be considered when storing coal are as follows:

a. The avoidance of an external source of heat which may in any way contribute toward increasing the temperature of the mass is a first and prime essential.

b. There must be an elimination of coal dust or finely-divided material. This will reduce to a minimum the initial oxidation processes of both the carbonaceous matter and the iron pyrites. These lower forms of oxidation are to be looked upon as forces, without which it would be impossible for the more active and destructive activities to become operative.

c. Dryness in storage and a continuation of the dry state, together with an absence of finely-divided material, would practically eliminate the oxidation of the iron pyrites.

d. Artificial treatment with specific chemicals or solutions intended to act as deterrents does not offer great encouragement, though some results seem to warrant further trial in this direction.

e. By means of a preliminary heating, the low or initial stages of oxidation are effected. These sources of contributory heat being removed, the forms of destructive oxidation are without the essential of a high starting temperature and are therefore inoperative. Whether such preliminary treatment is within the realm of practical or industrial possibility could not, of course, be determined within the scope of these experiments.

f. The submerging of coal, it is very evident, will eliminate all of the elements which contribute toward the initial temperatures. As to its industrial practicability, like the conditions under *e* above, it can best be determined by actual experience.

g. Other processes may be suggested by the formulation of the principles involved. Such, for example, would be the distribution throughout the coal of cooling pipes through which a liquid would circulate having a lower temperature than the mass. This would serve to carry away any accumulation of heat and confine the oxidation to the lower stages only. On the contrary the proposition sometimes made to provide circulating passages for the transmission of air currents is of questionable value, since it may result in the contribution of more heat by the added accessibility of oxygen than will be carried away by the movement of the air.

Atmospheric temperature at time of stocking is also a factor which should not be overlooked. It is preferable to store coal in April and May, even though it is to be carried in stock until the fall and winter, than it is to store it during the hotter periods of June and July. When practicable it is also desirable to hold coal in cars or in small piles six weeks after mining to allow it to pass through the "seasoning" stage, after which it can be placed in piles 15 to 20 feet deep with comparative safety.

Conclusions.—The storage of bituminous coal can only be made feasible by the producer, carrier and consumer co-operating closely to carry on the work in a systematic and economical manner.

One million dollars spent by producers for storage facilities will afford more relief to the coal industry than five million spent in the development of new mines.

One million dollars invested in storage facilities by railroads would go further toward relieving operating tangles and prevention of car shortages than three million invested in cars and locomotives.

The purchase of coal by the industrial and domestic consumers, during the dull periods, will result in a saving of a very high per cent. on the investment.

The storage of coal carried on successfully means:

More regular working of the mines, resulting in—
(a) Lower cost of production.
(b) Better satisfied labor.
(c) More efficient mining methods and a greater percentage of coal extracted.

Equalize movement, enabling carriers to provide equipment and handle at minimum cost.

Avoid the spasmodic demands for certain sizes, resultant car shortages, boom prices, sharp practices to escape contract obligations, and the general dissatisfaction resulting from the various causes enumerated.

The consumer to receive sufficient concessions from producer and carrier to offset the expense and deterioration incident to storage and withal enjoy a reduction in the ultimate cost.

Confine coals to proper distance zones and enable operators to work out nearby fields more thoroughly instead of mutilating them to get out a little cheap coal to meet the keen competition, leaving a greater percentage of coal in the ground in such shape that it can never be recovered.

Accomplish more in the conservation of our coal resources than any other one agent.

DISCUSSION

Exception was taken to the author's price of ten thousand dollars for the plant described in the paper and this was corrected to read twenty thousand dollars. Written discussion by Mr. Schaefer, of Roberts & Schaefer Company, stated that in the southwest a coal storage plant of 50,000 tons capacity is to be erected at a cost of about $50,000. Allowing a depreciation of 10 per cent. and an interest charge of 6 per cent., together with all other costs it is figured by the corporation building this plant that a profit of 10 per cent. will result. Coal will be purchased and stored during summer months when the price is low and will be sold in winter at the advanced prices.

Many members believed that storing of coal would materially reduce labor troubles at the mines on account of more uniform wages and provide more uniform coal traffic throughout the year, thus greately reducing the shortage of coal cars in early winter. Various figures as to the depreciation of the coal, ranging from four-tenths of one per cent. to about 3 per cent., were cited. Some members have found that the storing of coal was entirely practical.

There is no question but that some coals have a tendency to slack and deteriorate and give unsatisfactory service, but it was pointed out that if the large sizes of coal which are readily obtained in the summer months were stored this slacking and disintegration feature would not be so undesirable. Storage coal will have to be fired differently than if it had not been stored.

SIZING COAL FOR LOCOMOTIVE USE

A. G. KINYON
Locomotive Fuel Engineer, Clinchfield Fuel Company

In locomotive use of coal the first requirement is efficiency to the end of rapid and sufficient steam generation. This does not always mean economy of fuel, but there are many things, which, if properly considered and put into practice, will give efficiency with economy of fuel also. A fundamental law or condition for perfect combustion of coal is that, "Oxygen must touch the fuel burned." Not only must the oxygen touch the fuel burned, but the more intimately mixed the oxygen is with the fuel, the more perfect the burning will be. It is, of course, understood that the air which is drawn through the fire by means of the draft appliances, supplies this oxygen. A cube of coal 6 in. each way would have 216 sq. in. of surface or area. If, however, this 6 in. cube be broken up into 1 in. cubes, there would be 216 of these cubes and each cube would have 6 sq. in. of surface or area, or a total area of 1,296 sq. in. against the 216 sq. in. of the 6 in. lump. It will be seen and admitted from this that the smaller the lumps or pieces into which a given quantity of coal is divided, the greater the area exposed to contact with the air. It does not follow, however, that the further this is carried the better the results will be.

The limit of the smallness of the size of the coal is fixed by the tendency of the fine particles of coal to lie so closely together as to prevent the free passage of air through the fuel bed, rather than to the light weight of the small particles. But this tendency to prevent the free passage of air through the fire also tends to tear holes in the fire. This condition is what causes particles of partly consumed coal to be carried out of the stack. We believe that particles as small as ⅛ in. cubes can be fired in ordinary locomotive service without fear of loss due to their small size and weight. From the writer's experience in firing different coals under various conditions, it has been found that the best results possible are had with coal not larger than 3 in. cubes, and preferably with 1 in. cubes, when the proper methods of firing are followed. Proper methods of firing are believed to be, having a light, level fire, supplying the coal in small quantities at frequent intervals, and distributing each shovelful over as large an area as possible. We know that if a shovelful of very fine coal be thrown upon a brightly burning fire, and spread over a large surface, the volatile matter or hydrocarbons will be evolved instantaneously and there will be little time or chance for them to burn, and much of them will go away in the form of dense black smoke. This, then, is another limiting condition as to the small size of the coal.

To have any fire produce satisfactory results in the way of steam making and economy, it must burn evenly and solidly. By solidly is meant without large holes in places, but a myriad of small openings at all points, through which the air passes easily and evenly. This is not possible when the supply coal is made up of very fine particles and large lumps. If we build the fire up to the thickness required to have it burn solidly and evenly with the large lumps, we will have it heavier than it should be for economy. Another objection to large lumps is the fact that it is necessary to put in large quantities at each firing, thus tending to reduce the

firebox temperature and possibly bringing it down below the splitting up point of the gases, and they are lost entirely.

Methods and Cost of Preparing the Coal.—Inquiries were sent out in regard to the best methods of preparing coal for locomotive use. Some thought the preparation should all be at the mines and others at the tipple. All agreed that the locomotive was not the proper place to prepare it, at least for hand firing. One correspondent gives $5,000 as the cost of a crusher installed at a mine to crush run-of-mine coal. The crusher handled 100 tons per hour and takes the coal just as it comes from the mine, without any labor cost, and the cost for power is practically nominal, being only $15 for the first month's operation. If this mean an operation of the crusher 10 hours a day for 26 working days a month, it would cost only a small fraction of a cent per ton for this crushing.

The advisability of sizing the coal at the mines for coaling station depends upon the nature of the coal, the number of times it will be handled from the mines to the locomotive tender, and the means of handling it. Many of the coal handling appliances are crushers as well as conveyors, and, as one correspondent says, with a soft or friable coal, it becomes too small for best results when delivered on our locomotives, although it is reduced in size only by the repeated handling it undergoes. The hard splint coals of West Virginia, the block coal of Indiana and certain Iowa coal, all of which the writer has had experience with, are all too hard to expect any fireman to break on the locomotive. It is admitted that if the fireman gives proper attention to the matter of firing and other duties, such as watching signals, etc., he has no time or inclination to properly break lumps.

It is the writer's opinion that where coal is machine mined and shot only with powder, the best and cheapest method of sizing for all concerned will be to pass it over a 5 or 6 in. screen. The amount of fine slack coal so mined is negligible and the lumps that pass over the screen can be disposed of for other purposes and at a higher price, which will allow a lower price for locomotive fuel. Accurate and positive information as to costs and economy of sizing coal for locomotive use has not been found by the writer.

DISCUSSION

In dynamometer tests recently made by the Baltimore & Ohio with one and one-half inch screen, nut pea and slack coal was about 15 per cent. better than three-fourths inch screen slack. With the increased service required of locomotives it was believed that too much attention cannot be given to placing good coal of correct size on the locomotive tender.

MODERN LOCOMOTIVE COALING STATION

The committee has decided that, as practically each railroad will have certain restrictive conditions that might prevent the adoption of any recommendations that might be made, it would serve the best interests of the association by submitting only such suggestions as might embody the best recommended practice for securing the highest true economies.

Location.—We would emphasize our former conclusions, revised as follows:

The committee recommends a very careful study of the character and source of the supply of fuel, and its possible future permanency, before locating any so-called permanent structures.

Where it can be accomplished without too great an expense, modern coaling stations should not be located at the large centers of population.

It might prove economical to locate coaling stations away from terminals a distance equal to that which can be covered by one locomotive tank supply.

Grade conditions, density and direction of traffic, loaded and empty car haul, junction point, location of supply, are all factors for careful consideration.

Design.—The committee feels that three types should cover the usual requirements and has confined its consideration to these three types:

Type One.—Gravity chutes, drop-bottom cars, handled up incline by locomotives or by oil, electric or steam power hoists.

Type Two.—Balanced buckets, using oil, steam or electric power; drop-bottom cars, coal dumped into pit and elevated by one to four balanced buckets, holding one to three tons each.

Type Three.—Bucket conveyor, using oil, steam or electric power; drop-bottom cars, coal dumped into pit and hoisted to main bins by small buckets on chain or link belt.

There are certain general features that should be embodied in the design of any of these three types, and the committee would make the following recommendations:

Breaker bars are deemed necessary and should be used until such times as the railroads may be able to arrange for the proper preparation of the size of the coal at the mines.

The track openings should always be so generously designed and provided as to fit the length and the width of the openings of the cars, and to prevent any clogging and to provide free and easy dumping.

The storage bins should be designed to permit of frequent cleaning and inspection. They should be divided by at least one partition and each subdivision should be furnished with several openings. All receptacles for coal should be designed to avoid the probability of any clogging in the corners. Warped surfaces ending at the openings will naturally destroy a certain amount of storage capacity, but should be given careful consideration. Whenever practicable, the point of delivery of the fuel to the bin should be directly above the opening of the discharge of the fuel to the tank.

If coal is easily fractured or powdered and whenever the fall is of considerable height, deflectors may be used to advantage, but they may be the cause of the fuel clogging.

The committee again calls attention to the necessity for providing warped surfaces or valleys at the angles of all storage bins and pockets, and this recommendation affects its suggestions in this connection. Naturally no fixed angle can be recommended to cover all classes of fuel, but it is believed that a slope of from 35 to 45 deg. will best serve in designing bins, pockets, hoppers, chutes and aprons.

All gates, doors, etc., should be designed to be freely opened and to the full size of the opening, to provide for the easy releasing and movement of the fuel.

The capacity of any coaling station is naturally dependent on the proper preparation of the fuel, the regularity of its supply and the frequent switching service of the road cars. Where these are normal and dependable, the committee recommends the following, with the understanding that it is not economical or desirable to hoist during the night hours:

Type One

For 24 hours' service for	10	locomotives	100 tons
For 24 hours' service for	25	locomotives	200 tons
For 24 hours' service for	50	locomotives	400 tons
For 24 hours' service for	100	locomotives	600 tons

Type Two

For 24 hours' service for	10	locomotives	100 tons
For 24 hours' service for	25	locomotives	100 tons
For 24 hours' service for	50	locomotives	200 tons
For 24 hours' service for	100	locomotives	400 tons

Type Three

For 24 hours' service for	10	locomotives	100 tons
For 24 hours' service for	25	locomotives	100 tons
For 24 hours' service for	50	locomotives	200 tons
For 24 hours' service for	100	locomotives	400 tons

The foregoing capacities are recommended, having in mind the necessity for filling the bins several times during the day, and stations should be designed to provide for hoisting capacities (minimum) as follows:

For 50-ton bin capacity	20 tons per hour
For 100-ton bin capacity	40 tons per hour
For 200-ton bin capacity	60 tons per hour
For 400-ton bin capacity	100 tons per hour

In regard to the construction the committee recommends reinforced concrete and steel construction as being first choice, but in any event steel should be used for all supports under bins

and hoppers, and for the general structure. Whenever any of the storage parts come in contact with the fuel, they should be protected by reinforced concrete slabs.

The committee recommends that more care be used in the selecting of the men for operating the modern locomotive coaling station, and it believes that it would be economy to select men with sufficient mechanical experience to intelligently inspect and operate the plant, and to make running repairs thereto. A more careful inspection and operation would reduce maintenance costs and many running repairs would be made that now are expensive, due to careless or ignorant operation, and unintelligent reports.

Costs.—We have endeavored to secure actual figures to show costs for operating the different typees of stations for the fiscal year ending June 30, 1913, but so few replies have been returned in answer to our inquiries, that an analysis of the subject is hardly possible. They would indicate that there are as many methods used to secure the figures as there are systems submitting them.

The report is signed by Hiram J. Slifer, chairman, E. A. Averill, E. E. Barrett, W. E. Dunham, G. W. Freeland, W. T. Krausch and R. A. Ogle.

DISCUSSION

Where scales are used they should be carefully inspected periodically; otherwise they will not be any more accurate than the practice of measuring by volume. Many believe that the volume method of estimating coal placed on the tender is fully as satisfactory as weighing and much less expensive. Some members favored greater angularity to the floors of storage bins, as tests have shown that run of mine coal will not discharge much under 48 to 50 deg. While this decreases the volume it will ensure a better mixture of the slack and lump, otherwise the slack will collect on the floor of the bin and bring about favorable conditions for spontaneous combustion. All storage bins should be thoroughly cleaned periodically, and often as necessary depending on the grade of coal used, to prevent fires. The Burlington provides twin storage bins and alternates their use so that they may be thoroughly cleaned.

FIRING PRACTICES

The committee changed its recommendations of last year and they were accepted by the association. Considerable discussion took place on the size of shovels; the majority believed that the best results would be obtained with a No. 3 shovel, both as regards economy of fuel and fatigue of firemen.

COAL SPACE AND ADJUNCTS OF TENDERS

BY L. R. PYLE
Traveling Fireman, M. St. P. & S. S. M.

On large locomotives when the full tractive effort is sustained for long periods, the fireman should give his entire attention to his work in the cab. We instruct him to fire lightly and frequently, and if he is to do this the coal must always be within reach. When the fireman starts to reach for coal, the fire and steam pressure will suffer, as the fire is neglected during the time he is out of the cab, and in order to regain the lost steam pressure he puts in large amounts of coal and does not take time to do it properly, so the fire is banked and soon clinkers.

Types of Hoppers.—While gravity hoppers on the tender are not ideal, they are much better than the old rectangular flat bottom coal spaces. Where coal stations are close together, or the coal is of high grade and large quantities are not used, the sides of the coal space should be vertical about one-third the way and then slope toward the bottom of the coal space at an angle of 65 or 70 deg. Overloading is the cause of great waste and should be stopped, but first, or at the same time, build the tender so there is no incentive to overload. Some roads using tenders of large coal space, start the slope in the back from the top of the coping down to the shovel sheet at an angle of about 50 deg., instead of having a vertical back to the coal space.

From my observation in different parts of the country and from reports received from many roads, about ten tons is all the coal that will come down to the fireman. If the coal is well prepared, they may get more, and if not well prepared they will get less.

Coal Gates.—Coal gates should be of iron with a supplementary gate on the bottom, which should work on a pivot so that it may be raised or lowered at will. Some prefer the gates in four pieces, which is a good plan when the gates are very high. The inverted V-shaped opening in the bottom of the gate should be about 14 in. high and 24 in. wide. We have found that this opening will allow all the coal to pass through. When the coping is high, an arch or yoke should be placed over the gate to keep the sides from bulging.

Wings or Fenders.—A fender in the gangway helps to keep coal from rolling out, and should be used, if the apron does not extend too far back. It might be possible to have a double fender, placed tandem in the gangway with a pivot in the center so that the fender may work with the apron. As a fender on the left side is in the way of the fireman I would not recommend one on the left side. In case the fender is not desirable on account of the element of safety the gates may be set back from the front of the water leg of the tender about 6 in. and this will form a shoulder which will act as a fender.

Mechanical Coal Passer.—In order to promote economy to the highest degree we must expedite the movement of trains without an increase in the cost per ton mile, and a tender with ample water space with a coal passer will assist greatly in securing this result. On one trip while riding an engine equipped with a late type of coal passer, we made one hour and thirty minutes better running time than we could have made had we stopped for coal twice, as would have been necessary with the hopper type of tender. This time was made by being able to make better meets and passing points for passenger trains. Once the train despatcher finds out that he can keep a train moving, he will do it, and it will save hours every trip.

Another feature in favor of the passer is that the coal is delivered to the fireman in the best possible condition. There is fresh coal on the tender all the time and the slack and lumps are kept well mixed. On many divisions where the power is large and coal stations are thirty to fifty miles apart, every other one can be eliminated by the use of the passer, which would effect a saving of at least $2,000 a year on each coal chute which supplies 125 tons per day.

There are two types of the tilting hopper: One which fits inside the coal space, and one which is a hopper which rests in a bed on the front part of the tender. The last mentioned is much the better type. On the plunger type passer the main trouble which developed was, that the cylinder which contains the piston which operates the plunger was too small. The valve motion on this type gave some trouble on the first engines equipped. Both of these defects have been corrected in the late type, and on the new mikado engines on the Chicago & North Western this type of passer is giving the best of service. It delivers all the coal to the fireman and in one month not one cent has been spent in repair, and it works all the time.

No more trouble has developed with this device than with many other appliances used on locomotives, and if men who maintain the locomotive will spend a little time and money on this device (just a small part of what is spent on some things no more needful than the passer) the coal passer is sure to be a success, and when it is once in use we will wonder how we ever did without it.

DISCUSSION

The moral effect on the fireman of having labor saving devices, such as the coal passers, will be such as to greatly increase his efficiency and will thus be a step toward fuel economy worthy of the expenditure. It would eliminate the necessity of two firemen where two are ordinarily required. The roads using coal passers report that they are very satisfactory. By their use the tenders will not have to be coaled as often which

in some cases necessitating the haulage of coal to outlying points. The coal is also better mixed, as there is no opportunity for the slack to collect.

PRE-HEATING LOCOMOTIVE BOILER FEED WATER

By Monro B. Lanier
Vice-President, Norton Coal Mining Company

In practice, stationary boilers of the highest type of efficiency equipped for test under ideal conditions, may possibly evaporate as high as 12 lb. of water from and at 212 deg. F. per pound of combustible of 14,600 B. t. u. content, which expressed in terms of boiler and firebox efficiency is less than 80 per cent. In practice the average percentage of efficiency obtained is not more than 60 per cent., representing an equivalent evaporation of approximately 9 lb. of water from and at 212 deg. F. per pound of combustible of the stated thermal value.

The locomotive is said to be the least efficient of all steam generators, due primarily to extreme radiation and loss of unconsumed combustible matter. The average actual evaporation from a locomotive boiler per pound of coal containing 12,500 B. t. u.'s is not more than 6 lb., representing an equivalent evaporation of 6.534 lb., presupposing an initial feed temperature of 180 deg. F., and 200 lb. gage pressure. In actual road service, under practically perfect working conditions, with fuel of the above stated thermal value, a greater equivalent evaporation has been obtained, reaching perhaps 7 lb. of water per pound of coal, indicating boiler efficiency of perhaps 55 per cent.

Having exhausted all means in our presupposed perfect working conditions, to attain higher evaporation and efficiency, the utilization of part of that energy otherwise lost to the locomotive is requisite; one effective means being the pre-heating of locomotive boiler feed water, which can be accomplished independently or in connection with superheating steam. That material benefit can be derived from pre-heat properly applied is generally accepted as an axiom and dismissed from thought; in point of fact there is probably no more potent factor in locomotive efficiency, fuel economy and boiler up-keep. In this discussion the term "pre-heat" is applied to that temperature transmitted to the feed water prior to its introduction into the boiler. Pre-heat is a reclaimed by-product as differentiated from direct heat applied at the expense of the fuel and heat generating plant.

Passing over other operating advantages, no claim for fuel economy can properly be made for the increase in feed temperature by means of the injector—the boiler being robbed of steam of high temperature and reimbursed with the condensation, the temperature of which averages 140 to 200 deg. F. The finer the water supply to the injector is cut down, the greater is the volume of steam used per pound of water delivered, and notwithstanding the increased feed temperature a direct loss of energy to the boiler results therefrom.

In connection with injector fed boilers, pre-heat to be of value must be added between the initial temperature and the final possible delivery temperature of feed water, the former being the injector delivery temperature, viz., 140 to 200 deg. F., the latter being the sensible heat of saturated steam at a given pressure.

We have worked out a table expressing in percentage the net fuel economy to be derived from pre-heat from different initial feed water temperatures at a given absolute pressure.

Saving of Fuel by Heating Feed Water

(In per cent.—Steam 200 absolute, representing 185 gage pressure.)

Item No.	Initial Temp. Fahr.	Final temperature F. 120	140	160	180	200	220	250	300	380
1	32	7.93	9.90	11.96	14.09	16.30	18.61	22.24	28.80	40.92
2	60	5.40	7.34	9.34	11.42	13.68	15.84	19.37	25.80	37.63
3	80	3.60	5.50	7.47	9.52	11.65	13.85	17.34	23.65	35.27
4	100	1.80	3.68	5.61	7.61	9.70	11.88	15.30	21.50	32.92
5	120	....	1.83	3.74	5.71	7.76	9.90	13.26	19.35	30.57
6	140	....	....	1.87	3.81	5.82	7.92	11.22	17.20	28.22
7	160	....	....	....	1.90	3.88	5.94	9.18	15.05	25.87
8	180	....	....	....	....	1.94	3.96	7.14	12.90	23.52
9	200	....	....	....	....	....	1.98	5.10	10.75	21.17
10	210	....	....	....	....	....	.99	4.08	9.67	19.99
11	220	....	....	....	....	....	....	3.06	8.60	18.81
12	250	....	....	....	....	....	....	....	5.37	15.29

With boilers operating with steam at 200 lb. gage pressure, the metal parts are subjected to high temperature, causing extensive expansion throughout; water suddenly introduced into the boiler at very low temperature causes extreme sudden contraction of the bolts and the sheets. The nearer the temperature of the feed water to that of the steam, the less injury will result to the boiler. This has been practically illustrated on railroads that have locomotives in service equipped with pre-heaters. Also an even steam pressure can more readily be maintained with a minimum degree of saturation of the dry steam, thereby increasing the capacity of the locomotive, particularly those operating with saturated steam.

PRE-HEATERS

The New Orleans Great Northern is equipping locomotives with a device gotten up in its shops for the purpose of pre-heating the feed water. The construction and design of this pre-heater is simple, consisting of an auxiliary exhaust heater in connection with a front-end or smokebox heater operated in tandem.

The auxiliary heater consists of a cylindrical shell 8 to 10 ft. in length, containing a number of copper tubes running lengthwise with the shell; this device is applied on the branch pipe—between the injector and the boiler check—and is connected with an exhaust pipe from the pump. The branch pipe continues from the forward end of the heater through the front end into the lower forward portion of the smokebox heater.

The front end heater is simply a hollow diaphragm supplementing the regulation diaphragm for each respective engine, yet of the same shape and arrangement with regard to location, etc. The space within the diaphragm is arranged in sections by diverters, placed in such position as to force the circulation of the water over the widest possible area; no set rules are given as to the exact location of the diverters, this being governed by the size and shape of the diaphragm.

With the injectors in operation, the feed water passes from the branch pipe through the copper tubes of the exhaust heater to the front end of the smokebox heater. It then passes upward, circulating over the hot flattened surface around and through the diverters, leaving the heater at the top where it enters the boiler through a check valve. Line checks are placed in the branch pipe at both ends of the auxiliary heater, an exhaust pipe to the atmosphere relieving the shell of such steam as is not condensed.

A "T" on the branch pipe between the exhaust heater and the front end connects with the boiler check, and valves are so adjusted on both lines as to divorce the feed from the front end heater at any time this may be desired. A connection is made from the lower portion of the boiler to the smokebox heater, permitting, when opened, the circulation of water from the boiler through the heater.

The increase in feed temperature from each of the two heaters is governed by working conditions—the operation of the injectors, the size and speed of the pumps and the front-end temperature.

The following observations were made in regard to delivery temperature from each heater, and the degree of pre-heat obtained under approximately similar working conditions.

Gage Pressure 185 (200 Absolute)

Injector monitor No. 10 Operating	Delivery temperature from injector	Delivery temperature from exhaust heater	Delivery temperature, front end heater	Total degrees pre-heat	Percentage indicated economy
Full open....	150	195	220	70	6.28 per cent.
¾ open.....	160	200	220	60	5.94 per cent.
½ open.....	180	210	230	50	5.00 per cent.
¼ open.....	210	230	260	50	5.15 per cent.
Average	160	200	220	60	5.94 per cent.

It is claimed by the mechanical department of the N. O. G. N. that the engines equipped with this pre-heater are operating more economically, that the heretofore poor steaming engines are now kept hot readily and an even pressure maintained; further, that

leaky flues, mud ring and broken staybolts have been reduced to a minimum.

Many Mallet locomotives are equipped with pre-heaters which are practically auxiliary boilers contained within the extension front end. Observations made on the Santa Fe on operating Mallet locomotives indicated an injector delivery temperature of 190 deg. F. and a final delivery temperature to the boiler of 245 deg. F., a gain by pre-heat of 55 deg. F., representing a saving of approximately 6 per cent.

The Pere Marquette has a number of locomotives equipped so that the exhaust from the pump is discharged into the tank—a 3-way cock is placed in the exhaust line, leading from the air pump to the cylinders; from this connection a pipe is run from the cab and back to the tank, a hose being used between engine and tender. By this arrangement the exhaust steam from the pump can either be used for heating the tank water or exhausted through the engine stack at the will of the engineman. An average temperature of approximately 100 deg. is maintained in the tank, representing an increased average tank temperature of perhaps 40 deg., which is of some value, the injector delivery temperature increasing appreciably. The apparent difficulty involved in this system is the possibility of heating the tank water to a degree that cannot be handled by the injector, and the bursting of the hose connections.

The problem of pre-heating water seems to have received greater attention in Europe than in America. There are a number of systems of pre-heating in practice on English and continental lines. One or more of the European devices have been experimented with in this country with more or less success. One of these systems eliminates injector boiler feeding, accomplishing this through means of a steam driven pump. The source of the pre-heat is exhaust from the cylinders and pumps. A part of the exhaust from the cylinder is taken from the nozzle by means of a shutter or flap valve controlled from the outside of the smokebox, and is passed through an automatic regulating valve in connection with the exhaust from the pumps and introduced into the upper of two heating tanks; thence through a pipe into a lower heating tank, the water surrounding the tubes in the tanks absorbing the heat from the steam, the condensation running out to the ground.

The water pump is located on the back end of the frame under the cab. Two cylinders are necessary for the pump, as the upper heater is higher than the water in the tank, so that it would otherwise be impossible to properly lift the heated water from the heater to the pump. The principle of the heater is the same as the surface condenser except that the exhaust steam travels through the copper tubes and the water flows over and around, absorbing heat from these tubes in its passage.

DISCUSSION

Pre-heating was strongly endorsed if a practical method can be obtained for accomplishing it. The Burlington is experimenting with a feed water heater using a duplex pump for forcing the water into the boiler. The heater is located in the tank and utilizes the exhaust steam from both the air and water pumps. Tests have shown an economy of 12½ per cent. Some members are turning the air pump exhaust into the tank with good results, care being taken not to get the water too hot for the injectors.

Raffe Emerson read a paper on Fuel and Engine Failures, describing the progress made in this respect by the St. Louis Southwestern under the direction of T. E. Adams. This road has averaged less than sixteen failures per month during the past eleven years and only ten failures per month for the past six years with about two hundred engines. The yearly average mileage per failure is about 65,000 miles, and a record has been made of over 500,000 miles without a failure.

OTHER BUSINESS

President Mohler, of the Union Pacific, made a few remarks at one of the sessions on the opportunities for economy in fuel, laying particular stress on the co-operation necessary between all departments of the railroad. He was thoroughly in sympathy with the work of the association and believed it had great opportunities ahead of it.

H. L. Cole, assistant secretary of the government railway board of India, attended the meeting. He is making a tour of inspection of American railroads.

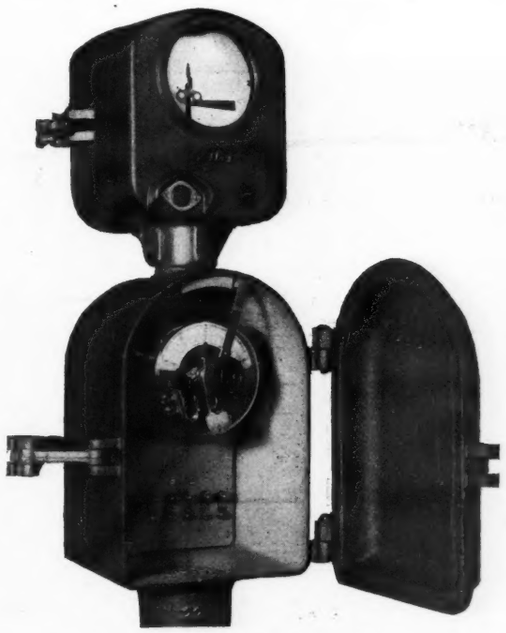
The secretary's report showed a total membership of 642, with a cash balance of $885.25.

The closing session on Thursday morning will be reported in next week's issue.

SWITCH INDICATOR WITH PUSH BUTTON AND TIME RELEASE

The Union Switch & Signal Company has designed an improved switch indicator to save power and to provide an instrument for outlying side tracks which may be used without track circuit preliminaries. The time release is enclosed in a separate box placed below the indicator. It is of the clock work type which The Union Switch & Signal Company has made for some time. The saving of power is secured by the use of a push button, so arranged that when the button is depressed contacts close the circuit for the indicator, provided the external circuit is complete. The indicator will not clear by the depression of the button unless energized by the external circuit.

In service the indicator is normally de-energized and the blade stands in the horizontal position. A trainman, waiting on a siding and desiring to use the switch, would push the button;



Switch Indicator with Time Release

and if the indicator cleared it would show that there was no train approaching, and that conditions were proper for the train to leave the siding. As soon as the switch is opened the signals leading over the switch are set to the stop position; and then the indicator assumes the normal, or stop, position. It cannot again be cleared until conditions in the block for which it indicates are restored to normal.

The time-release arrangement is employed where it is undesirable to control the switch indicator by track circuit preliminaries. It should provide a time interval equal to the time taken by a train to pass through the preliminary track-circuit section.

The trainman desiring to use the switch first unlocks the box and then starts the release by a slight turning of the knob in the center. At the expiration of a predetermined time he de-

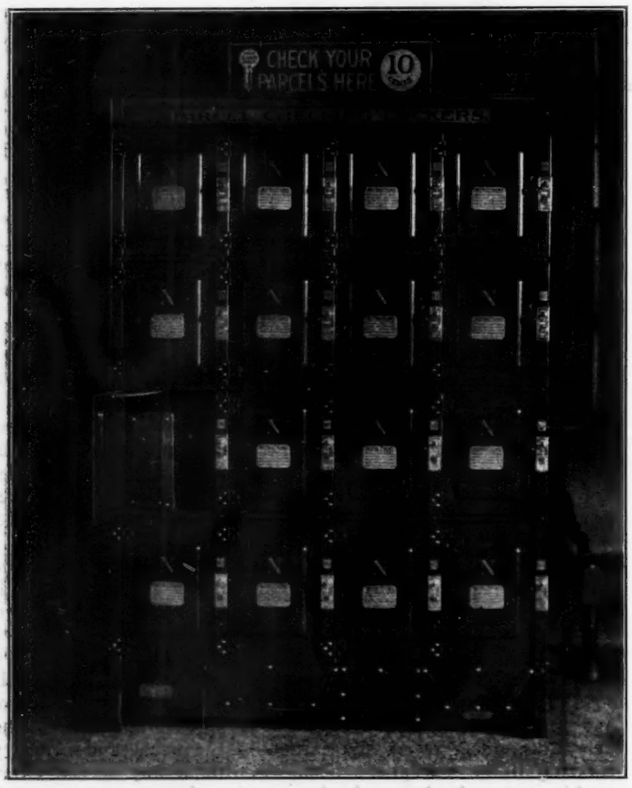
presses the push button, and if the block is free the indicator will clear. If the indicator clears, the switch may be thrown and the train proceed on to the main line. The first movement of the time release sets all signals leading over this switch to the stop position and so long as the time release is in other than the normal position the signals are held at stop. The throwing of the switch continues to hold the signals in the stop position and restores the indicator to the normal or stop position. The box cannot be closed and locked unless the time release is restored to the normal position, so as to close the signal circuits, this action taking a small movement of the time release knob in the reverse direction.

The switch indicator can be operated on either A. C. or D. C., and the time release can be built for any time interval from 15 seconds to 4 minutes. As the indicator is clear only a short time when used with the time release arrangement, the push button attachment may be eliminated, thus simplifying the operation by trainmen.

AUTOMATIC PARCEL LOCKERS

Automatic coin-controlled parcel checking lockers have recently been installed by the Chicago & North Western in the waiting rooms of several of its more important passenger stations, which enable patrons to check their own baggage without the necessity for having a parcel checking room and an attendant. The cabinets used for this purpose, one of which is illustrated herewith, are constructed of steel and are built in three sizes, in batteries of 8, 12 or 16 lockers.

A patron desiring to check his bag, suit case or parcel, selects



Automatic Coin-Controlled Parcel Checking Locker

a vacant locker, as indicated by the fact that the key is in the lock, opens the door, places the baggage inside and closes the door. He then drops a dime in the slot, which releases the key, turns the key to the right and withdraws it. The key is his check and is numbered to correspond with the locker compartment occupied. There are no duplicate keys. To withdraw parcels the key is inserted and turned to the left, and the door is opened. The unlocking of the door automatically locks the key so that it may not be withdrawn again until a dime is deposited.

The interior of each locker is 16½ in. by 12½ in. by 28½ in., large enough to hold a large size suit case. The cabinets are attractive in appearance and are enameled in harmony with the surroundings of the station. They are clean, sanitary, and substantially proof against fire, water or burglary. The advantage to the railway is in the fact that it is not obliged to maintain a parcel checking room and an attendant, and the advantage to the patrons lies in the fact that there are no delays and no necessity for standing in line. They check their own parcels and no one else handles them. Therefore, there is no possibility of mixing or misplacing articles.

A preliminary test of these cabinets at two or three stations for a brief period showed that they were liberally patronized and evidently satisfactory to the patrons of the road, and they will accordingly be installed in a number of other stations which seem to be favorably located for the purpose. If further practical trial is satisfactory the installation and use of the cabinets will be extended as conditions justifying them may develop from time to time. The cabinets are manufactured by the Coin Controlled Lock Company, 29 South La Salle street, Chicago.

THE THINKING MAN

[From Louisville & Nashville Passenger Bulletin.]

Recently a local railroad officer who endeavors to keep close to the men in the service, sent a letter to every man in his department on the division requesting each to freely make any and all kinds of suggestions for the betterment of conditions and for affording more satisfaction to passengers and shippers. Every man came back with suggestions, some with many, others with only a few. The significant fact is they all had suggestions.

A direct and valuable by-product of this is thought. It is claimed that the human race has practiced everything except thinking. There is no real thought until it can be or is expressed in words. These men thought and thought clearly, concisely and intelligently. They produced the evidence. The thinking these men did will cause other thoughts to germinate and grow. In the thinking there will necessarily be much selection and much rejection. On the theory of increased product as the result of cultivation these men added more efficiency to their work in whatever department they serve. Efficiency lightens the "tonnage." Develop a man's mental machinery and his "tractive power" at once becomes greater—that is his pulling and doing capacity is enlarged. Then as his capacity is increased the present "tonnage" is easier to pull. Hence there is less liability of "hot boxes."

One of the fellows in casting about for suggestions that would improve his own condition and surroundings, noticed a window glass that was broken and it occurred to him to report it to the proper person. This caused him to notice that the glass was dirty. Acting upon the inspiration the glass was cleaned and he was somewhat surprised that he could see through it perfectly. It had never occurred to him before that the window was made to see through. When this was done the law of contrast began to get under headway and straightway he noticed there were many other things that appeared dirty, out of place and ill-kept in contrast with the clean window. The result was a general cleaning up. Then he began to take more pride in the place, and he met the public with a more pleasing smile.

AN ENGINEMAN ON AN ENGLISH RAILWAY FOR 57 YEARS.—Joseph Hull has just retired after 57 years of service as an engineman for the Maryport & Carlisle Railway of England. On his retirement he was presented with a purse containing a substantial sum which had been subscribed by his fellow employees and the public. He was also given a check for $125 by the directors of the company in recognition of his long service and the fact that he had never had a single mishap and had never had a demerit mark made against him.

General News Department

United States Commissioner of Mediation, W. L. Chambers, has rendered a decision settling a strike of conductors on the Savannah & Northwestern.

The House Committee on interstate and foreign commerce has made a favorable report in Congress on the Rayburn bill for the federal control of railroad stock and bond issues.

The Atchison, Topeka & Santa Fe has presented the Montezuma hotel and other property at the Las Vegas Hot Springs, New Mexico, to the Las Vegas Young Men's Christian Association. The hotel and a tract of 1,600 acres surrounding it represent an investment of $750,000.

The West Iowa division of the Chicago & North Western made a remarkable record last year in respect of freedom from engine failures. The engine mileage for the division for the year was 2,596,788, and there were only 38 failures, giving an average of 68,336 miles per failure. For the month of April, 1913, the engine mileage was 201,178 miles, with but one failure. For August the mileage was 252,556, with no failures, and for November the mileage was 201,118, with but one failure.

The Chicago city council committee on railway terminals on May 18 appointed a railway terminal commission, as provided in the ordinances recently passed for the erection of the new Union Station, to make a comprehensive study of the terminal problem of Chicago, and to make a special report on January 1, 1915. The membership of the committee is as follows: John F. Wallace, the engineer, retained by the committee; Bion J. Arnold, representing the citizens' terminal committee; Walter L. Fisher, also representing the citizens' terminal committee; E. H. Bennett, architect of the Chicago Plan Commission; Alderman Ellis Geiger, chairman of the council committee on railway terminals; L. A. McGann, commissioner of public works; and W. H. Sexton, corporation counsel.

Canadian Pacific Terminal Improvements at Vancouver

The Canadian Pacific terminal improvements at Vancouver, B. C., are nearing completion. The work includes a passenger station and office building located on land immediately east of the present passenger station and a dock 200 ft. by 490 ft. The main entrance to the station is located on Cordova street, with the main waiting room on the street level. The tracks are about 25 ft. below this level. There is provision for four passenger tracks, separated by wide platforms. Stairways and a lift connect the two levels of the station and a separate foot-bridge is carried over the passenger tracks and directly connected with the waiting room at one end and with the stairways leading to the track level, thus giving access to the platforms without crossing the tracks at grade.

In order to avoid a grade crossing and the consequent delays to traffic between the city and the piers, a steel viaduct is being built on the line of Granville and Burrard streets passing over the tracks to the piers. An incline is also being built on the west side of the Granville street viaduct to the wharf, thus giving access to the lower deck of the pier and freight sheds and to the water front.

The passenger station is a combination stone and brick structure with a steel frame. The station is divided into two principal levels, on the lower of which are the baggage, mail and express rooms, while on the upper are ticket offices and waiting rooms. Above the public rooms in the station the space will be devoted to the general offices of the company. The interior arrangement of the office space will be on the unit system and each unit will have complete heating and lighting facilities with partitions that may be readily installed or removed as changes in the arrangement of office accommodation become necessary.

It is expected that the station will be ready for occupancy this summer and that the steamship station facilities will be available somewhat earlier, but the present grade crossing over the freight yard tracks will have to be used for a month or two longer.

Messrs. Barrott, Blackader & Webster, of Montreal, are the architects for this work. Westinghouse, Church, Kerr & Co. are the engineers for the complete design, construction and equipment of the terminal.

Southern Pacific Veterans

The fifth annual reunion and luncheon of the veterans of the Southern Pacific, all of them pensioners, was held in San Francisco on May 9, in commemoration of the forty-fifth anniversary of the driving of the last spike of the Central Pacific at Promontory, Utah, thus connecting the tracks of the Central Pacific and Union Pacific, and establishing the first transcontinental line uniting the Pacific coast with the east. Pictures were shown illustrating the magnitude of the construction of the Panama Canal and the Central Pacific Railroad, both American achievements resulting from similar motives. The builders of the canal used high explosives, power drills, electricity, concrete and steel structure, steam shovels and dredges; but the railroad was built at a time when only black powder, hand drills, wooden structure, block and tackle, candles and sperm oil lamps were in use. Motion pictures of the building of the canal were shown. Addresses were made by President William Sproule, Vice-Presidents E. O. McCormick and W. R. Scott, and Col. John P. Irish.

Since the inauguration of the Southern Pacific pension system in January, 1903, the sum paid out in pensions to retired employees has reached $1,400,000; and 935 former employees have been accorded these financial benefits. There are now 555 pensioners on the roll.

The Average Rule in Demurrage

E. E. Mote, manager of the Pacific Car Demurrage Bureau, San Francisco, has sent a circular to all of the demurrage managers of the country asking their views as to the value of the "average agreement" and its effect on car efficiency; and he has issued a pamphlet giving the results of the inquiry. The replies, from 18 centers, scattered all over the country, are almost unanimous in the opinion that the average rule does not work for the interests of the carriers and ought to be abolished. These reports cover bureaus which have in effect over 8,000 average agreements, and in most of the associations these agreements cover from 15 to 50 per cent. of the cars handled. Ten of the 18 bureaus report that the average detention to cars is greater under the average rule than under the straight rule. Collections of $45,000 were made under the average plan, where, if the straight rules had been in effect, the collections would have been $101,000.

A shipper or receiver, knowing that in the regular course of his business, without any extra exertion on his part, he will earn a large number of credits, by delaying cars less than two days, delays the unloading of cars until it suits his convenience to do so, only being careful to unload before they earn any debits in excess of five. Practically all the demurrage the railroads get is the debits in excess of 5 per cent. Debits up to, and including five, which represent a large proportion of the delay, are offset by credits earned in the usual and ordinary conduct of the consignee's business, without any special effort on his part to load or unload promptly. One manager reports that he has as many disputes regarding charges and terms under the average agreement, as with other consignees. The average agreement benefits mostly those firms whose outbound business exceeds their inbound. An example is given of a mill which loaded out 110 cars on the day the cars were placed. That mill gets the credit of 110 days and pays no demurrage, although formerly it paid from $150 to $300 a month.

Mr. Thomason, manager of the New England Demurrage Commission, has given to Mr. Mote the replies from the prin-

cipal roads in his territory; and two roads, the Maine Central and the Rutland, say that they are not dissatisfied with the working of the average rule. The Maine Central says that the increased detention is more than compensated for by the elimination of exemption for weather interference and bunching. The Boston & Albany says that the only thing to be said in favor of the average rule is that it eliminates claims for bunching and weather interference.

International Railway Fuel Association

Among the exhibitors at the International Railway Fuel Association convention at Chicago, May 18-21, were the following:

American Arch Company, New York. Represented by Le Grand Parish, J. P. Neff, G. C. Denney, G. E. Crisp.

Atlas Car & Manufacturing Company, Cleveland, Ohio.—Storage battery locomotives for main entry and gathering work, also direct current and alternating current locomotives. Represented by S. D. Wright.

Barry Ivan-Turner Manufacturing Company, Chicago.—Kerosene carburetor. Represented by H. Q. Turner.

Bird-Archer Company, New York.—Boiler chemicals.

Carpenter & Co., Geo. B., Chicago.—Wire rope, packing, hose. Represented by H. D'Ever.

Chicago Pneumatic Tool Company, Chicago.—The Zerbee safety valve discharge register. Represented by L. J. Zerbee.

Dearborn Chemical Company, Chicago.—Photographs, samples of boiler compounds. Represented by F. C. Fosdick, J. D. Purcell, A. W. Cooley, W. S. Reid.

Electric Storage Battery Company, Philadelphia, Pa.—Tray of Ironclad-Exide cells, such as are used in mining storage battery locomotives. Represented by T. Milton.

Franklin Railway Supply Company, New York.—Franklin fire door. Represented by F. Coffin, W. L. Allison, S. D. Rosenfelt.

Goodman Manufacturing Company, Chicago.—Photographs and bulletins of electric locomotives and cutting machines. Represented by H. H. Small, A. F. Fors.

General Electric Company, Schenectady, N. Y.—Coal handling machinery. Represented by W. C. Adams, W. G. Ferguson.

Gurley & Schraeder, Chicago. Represented by R. E. Gurley, F. J. Schraeder.

Hamler-Eddy Smoke Recorder Company, Chicago.—Model of smoke recorder. Represented by Ray L. Eddy.

Hawkes Boiler Company, Chicago.—Photographs of Hawkes 2-in-1 boilers.

Hockensmith Wheel & Mine Car Company, Penn Station, Pa.—Mine car wheels, both plain and roller bearing; angle-bar truck. Represented by C. L. Herbster.

Justrite Manufacturing Company, Chicago.—Lanterns, oil cans, pails.

Locomotive Superheater Company, New York.—Sectional unit superheater, tube, sectional unit header, tools. Represented by Robt. Porterfield, W. A. Buckbee, G. B. Spaengler, G. Fogg.

Link-Belt Company, Chicago.—Photographs of coal tipple, coal crushers, conveyors, coaling stations, cranes. Represented by J. C. Nelleger.

Locomotive Arch Brick Company, Chicago.—Model economy brick arches. Represented by E. P. Stevens, J. L. Nicholson, R. E. Griffith.

Locomotive Stoker Company, New York.—Booth; photographs and catalogs.

Manning, Maxwell & Moore, New York (Ashcroft Manufacturing Company, Consolidated Safety Valve Company, Hayden & Derby Manufacturing Company, Hancock Inspirator Company).—Booth, photographs and literature. Represented by C. L. Brown.

Mudge & Co., Chicago.—Mudge-Slater spark arresters. Represented by B. W. Mudge, G. W. Bender.

Morgan-Gardner Electric Company, Chicago.—Photographs of coal cutters, mining locomotives. Represented by W. S. Middleton, A. G. Alexander.

McClave-Brooks Company, Scranton, Pa.—Photographs of grates, blowers.

Macomber-Whyte Rope Company, Chicago.—Wire rope.

Manistee Iron Works, Manistee, Mich.—Centrifugal pumps, centrifugal jet condensers, traveling grate stoker. Represented by Henry Vick.

National Graphite Lubricator Company, Scranton, Pa.—Model of graphite lubricator and photographs showing installations. Represented by L. S. Watres.

National Railway Devices Company, Chicago.—Shoemaker fire door. Represented by Jay G. Robinson, E. J. Gunnison, M. M. Auerbach.

Ottumwa Iron Works, Ottumwa, Iowa.—Photographs of hoists, etc.

Parsons Engineering Company, Wilmington, Del.—Photographs of Parsons system of combustion in locomotive fireboxes, showing elimination of smoke. Represented by W. H. Savery, W. H. Saylor.

Pneumelectric Machinery Company, The, Syracuse, N. Y.—Rock drill, coal punches, hoists. Represented by H. V. Brown.

Prox Company, Frank, Terre Haute, Ind.—Photographs of boilers.

Ryan, Galloway & Co., Chicago.—Mechanical coal passer and unclogable sand pipe; slack adjusting drawbar. Represented by A. E. Shultz, Y. J. Merriman.

Roberts & Schaefer Company, Chicago.—Model and photographs of coaling stations. Represented by W. R. Roberts, J. V. Schaefer, T. B. Simon.

Ridgway Dynamo and Engine Company, Ridgway, Pa.—Photographs and bulletins showing engines, generators, motor-generator sets, steam turbines. Represented by F. S. Hickok, W. F. Groom.

Snow Construction Company, T. W., Chicago.—Group of photographs of coaling stations, water stations, oil engines. Represented by T. W. Snow.

Simonds Company, G. L., Chicago.—CO_2 apparatus for testing combustion; Vulcan soot blower. Represented by G. L. Simonds, F. A. Moreland.

Sullivan Machinery Company, Chicago.—Post punches, hand sinking drills, photographs of iron clad coal cutters. Represented by W. P. J. Dinsmore, M. R. Blish.

U. S. Graphite Company, Saginaw, Mich.—Mexican boiler graphite. Represented by H. C. Woodruff, J. G. Drought, J. W. Eviston.

Westinghouse Electric & Manufacturing Company, East Pittsburgh, Pa.—Photographs of mining locomotives.

Williams Patent Crusher & Pulverizer Company, St. Louis, Mo.

Railway Signal Association

Secretary C. C. Rosenberg has issued the program for the meeting of this association to be held at the Hotel Astor, New York City, May 27 and 28. Reports are expected from 11 committees.

Committee No. 1, T. S. Stevens, chairman, will present illustrations showing a signal aspect for instructing a train to take the siding at a non-interlocked switch, an arrangement which has been found satisfactory on the Baltimore & Ohio. As shown in the report, an automatic block signal fixed a short distance in the rear of the switch, displays below its second arm a disk, 18 in. in diameter, bearing the words "TAKE SIDING." Both arms are in the stop position. When not required, the disk is dropped behind a metal shield. This committee will report a code of requisites for installation of switch indicators.

Committee No. 2, C. J. Kelloway, chairman, will present for discussion six drawings of layouts for derails and one for a double slip switch; and also a code of requirements for the protection of traffic at movable bridges.

Committee No. 3, F. B. Wiegand, chairman, presents for discussion, a report on the use of electric power at 30 volts, or less, for the control of interlocking apparatus. The report is based on statements received from 13 prominent roads, the majority of which are in favor of the use of this arrangement for outlying switches, where the cost of interlocking by ordinary methods would be prohibitive. The different proposals embrace schemes for voltages ranging from 10 to 30 and contemplating the operation of switches by electric motors in from four to 30 seconds. This committee also presents ten drawings for installation of vitrified clay conduit.

Committee No. 4, W. M. Vandersluis, chairman, will present revised specifications for primary battery and for a highway crossing bell.

Committee No. 5, G. S. Pflasterer, chairman, will present a revised code of rules for signal supervisors and a code of rules for the maintenance and operation of block signals, embracing the results following the discussion of this subject at the last meeting.

Committee No. 6, J. C. Mock, chairman, will present proposed standard drawings for a deck for bracket post signals and other details; and also will present for discussion, a drawing of an adjustable lock rod.

Committee No. 7, E. G. Stradling, chairman, will present for discussion a number of definitions for the proposed signal dictionary.

Committee No. 8, C. H. Morrison, chairman, will submit specifications for oil for transformers; petrolatum for use in impedance bonds; for an alternating current electric generator; and for regulation of overhead crossings of electric light and power wires, including specifications for testing the galvanizing of iron and steel.

Committee No. 10, R. B. Elsworth, chairman, will propose certain changes in the drawings of battery jars.

A special committee, W. N. Manuel, chairman, will present proposed forms of blanks for a maintainer's report. Another special committee, J. E. Saunders, chairman, will present a code of proposed requisites for lightning arresters. This committee gives the results of an extended inquiry into practice in the application of lightning arresters.

The Canadian Railway Club

At its meeting in Montreal, on May 12, the Canadian Railway Club elected officers for the ensuing year as follows: President, William McNab, principal assistant engineer, Grand Trunk; first vice-president, L. C. Orde, assistant master car builder, Canadian Pacific; second vice-president, R. M. Hannaford, assistant chief engineer, Montreal Tramways; secretary, James Powell, Grand Trunk; treasurer, W. H. Stewart, Canadian Pacific. The report of the secretary shows an increase in membership during the past year, and that of the treasurer shows a balance in the treasury of over $3,000. The club has been incorporated under the laws of the province of Quebec.

Freight Claim Association

At the annual meeting of the Freight Claim Association, held at Galveston, Tex., May 14, J. W. Newell, Chicago, Burlington & Quincy, heretofore first vice-president, was elected president; Edward Arnold, Grand Trunk, heretofore second vice-president, was elected first vice-president, and W. O. Bunger, Chicago, Rock Island & Pacific, was elected second vice-president. Secretary W. P. Taylor, Richmond, Va., was re-elected.

Cornell Alumni at Atlantic City

Professor Dexter S. Kimball, of Cornell University, will be the guest of honor at the ninth annual dinner of the Cornell alumni, who will attend the Master Car Builders' and Master Mechanics' conventions at Atlantic City. The dinner will be held on the closing day of the Master Car Builders' convention, Friday, June 12.

MEETINGS AND CONVENTIONS

The following list gives names of secretaries, dates of next or regular meetings, and places of meeting.

AIR BRAKE ASSOCIATION.—F. M. Nellis, 53 State St., Boston, Mass.

AMERICAN ASSOCIATION OF DEMURRAGE OFFICERS.—A. G. Thomason, Boston, Mass.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—H. C. Boardman, D. L. & W., Hoboken, N. J. Next convention, October, Washington.

AMERICAN ASSOCIATION OF GENERAL PASSENGER AND TICKET AGENTS.—W. C. Hope, 143 Liberty St., New York.

AMERICAN ASSOCIATION OF FREIGHT AGENTS.—R. O. Wells, I. C. R. R., East St. Louis, Ill.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—E. H. Harman, St. Louis, Mo.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—E. B. Burritt, 29 W. 39th St., New York. Annual convention, October 12-16, Atlantic City, N. J.

AMERICAN ELECTRIC RAILWAY MANUFACTURERS' ASSOC.—H. G. McConnaughy, 165 Broadway, New York. Meetings with Am. Elec. Ry. Assoc.

AMERICAN RAILWAY ASSOCIATION.—W. F. Allen, 75 Church St., New York.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W., Chicago. Next convention, October 20-22, 1914, Los Angeles, Cal.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—E. H. Fritch, 900 S. Michigan Ave., Chicago. Next convention, March 16-18, 1915.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—J. W. Taylor, Karpen Building, Chicago. June 15-17, Atlantic City, N. J.

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—A. R. Davis, Central of Georgia, Macon, Ga. Next convention, July 20-22, Hotel Sherman, Chicago.

AMERICAN SOCIETY FOR TESTING MATERIALS.—Prof. E. Marburg, University of Pennsylvania, Philadelphia, Pa. Next annual meeting, June 30 to July 4, Hotel Traymore, Atlantic City, N. J.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Chas. W. Hunt, 220 West 57th St., New York; 1st and 3d Wed., except June, July and August, New York. Annual convention, June 2-5, Baltimore, Md.

AMERICAN SOCIETY OF ENGINEERING CONTRACTORS.—J. R. Wemlinger, 11 Broadway, New York; 2d Thursday of each month, at 2 P. M., 11 Broadway, New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. June 16-19, St. Paul-Minneapolis, Minn.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—F. J. Angier, B. & O., Baltimore, Md. Next convention, January 19-21, 1915, Chicago.

ASSOCIATION OF AMERICAN RAILWAY ACCOUNTING OFFICERS.—E. R. Woodson, 1300 Pennsylvania Ave., Washington, D. C. Annual meeting, June 24, Minneapolis, Minn.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—C. W. Egan, B. & O., Baltimore, Md.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Ry., Chicago. Semi-annual meeting, June 12, Hotel Denis, Atlantic City, N. J. Annual convention, October 19-23, Chicago.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—P. W. Drew, 112 West Adams St., Chicago.

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—G. P. Conard, 75 Church St., New York. Annual meeting, Hotel Chalfont, Atlantic City, N. J., June 18-19.

ASSOCIATION OF WATER LINE ACCOUNTING OFFICERS.—W. R. Evans, Chamber of Commerce, Buffalo, N. Y.

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—L. D. Mitchell, Detroit Graphite Co., Chicago, Ill. Meeting with American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—James Powell, Grand Trunk Ry., Montreal, Que.; 2d Tuesday in month, except June, July and August, Windsor Hotel, Montreal.

CANADIAN SOCIETY OF CIVIL ENGINEERS.—Clement H. McLeod, 176 Mansfield St., Montreal, Que.; 1st Thursday, October, November, December, February, March and April, Montreal.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 841 Lawler Ave., Chicago; 2d Monday in month, except July and August, Lytton Bldg., Chicago.

CENTRAL RAILWAY CLUB.—H. D. Vought, 95 Liberty St. New York; 2d Fri. in Jan., May, Sept. and Nov. and 2d Thurs. in March, Hotel Statler, Buffalo, N. Y.

CIVIL ENGINEERS' SOCIETY OF ST. PAUL.—Edw. J. Dugan, P. O. Box 654, St. Paul, Minn.; 2d Monday, except June, July, August and September, Old State Capitol Bldg., St. Paul.

ENGINEERS' SOCIETY OF PENNSYLVANIA.—Edw. R. Dasher, Box 75, Harrisburg, Pa.; 1st Friday after 10th of each month, except July and August, 31 So. Front St., Harrisburg, Pa.

ENGINEERS' SOCIETY OF WESTERN PENNSYLVANIA.—Elmer K. Hiles, Oliver Bldg., Pittsburgh; 1st and 3d Tuesday, Pittsburgh, Pa.

FREIGHT CLAIM ASSOCIATION.—Warren P. Taylor, Richmond, Va.

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—A. M. Hunter, 605 Grand Central Station, Chicago; Wed. preceding 3d Thurs., Transportation Bldg., Chicago.

INTERNATIONAL RAILWAY CONGRESS.—Executive Committee, 11, rue de Louvain, Brussels, Belgium. Convention, 1915, Berlin.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—C. G. Hall, 922 McCormick Bldg., Chicago.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 829 West Broadway, Winona, Minn. Next convention, July 14-17, Hotel Sherman, Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—A. L. Woodworth, Lima, Ohio. Next convention, third Tuesday in August.

MAINTENANCE OF WAY MASTER PAINTERS' ASSOCIATION OF THE UNITED STATES AND CANADA.—T. I. Goodwin, C. R. I. & P., Eldon, Mo. Next convention, November 17-19, 1914, Detroit, Mich.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 95 Liberty St., New York. Next annual meeting, May 25-28, Hotel Walton, Philadelphia.

MASTER CAR BUILDERS' ASSOCIATION.—J. W. Taylor, Karpen Building, Chicago. June 10-12, Atlantic City, N. J.

MASTER CAR & LOCOMOTIVE PAINTERS' ASSOC. OF U. S. AND CANADA.—A. P. Dane, B. & M., Reading, Mass. Next convention, September 8-11, Nashville, Tenn.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—Bruce V. Crandall, 537 So. Dearborn St. Chicago. Next convention, March 15 to 19, 1915, Chicago.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass.; 2d Tuesday in month, except June, July, Aug. and Sept., Boston.

NEW YORK RAILROAD CLUB.—H. D. Vought, 95 Liberty St., New York; 3d Friday in month, except June, July and August, New York.

NIAGARA FRONTIER CAR MEN'S ASSOCIATION.—E. Frankenberger, 623 Brisbane Bldg., Buffalo, N. Y. Meetings monthly.

PEORIA ASSOCIATION OF RAILROAD OFFICERS.—M. W. Rotchford, Union Station, Peoria, Ill.; 2d Thursday in month, Jefferson Hotel, Peoria.

RAILROAD CLUB OF KANSAS CITY.—C. Manlove, 1008 Walnut St., Kansas City, Mo.; 3d Friday in month, Kansas City.

RAILROAD MASTER TINNERS, COPPERSMITHS & PIPEFITTERS' ASSOCIATION.—U. G. Thompson, C. & E. I., Danville, Ill.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 30 Church St. New York.

RAILWAY CLUB OF PITTSBURGH.—J. B. Anderson, Penna. R. R., Pittsburgh, Pa.; 4th Friday in month, except June, July and August, Pittsburgh.

RAILWAY DEVELOPMENT ASSOCIATION.—W. Nicholson, Kansas City Southern, Kansas City, Mo.

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOC.—J. Scribner, 1021 Monadnock Block, Chicago. Meetings with Assoc. Ry. Elec. Engrs.

RAILWAY FIRE PROTECTION ASSOCIATION.—C. B. Edwards, Mobile & Ohio, Mobile, Ala. Annual meeting, 1st Tuesday in October.

RAILWAY GARDENING ASSOCIATION.—J. S. Butterfield, Lee's Summit, Mo.

RAILWAY SIGNAL ASSOCIATION.—C. C. Rosenberg, Bethlehem, Pa. New York, May 27 and 28. Annual meeting, Bluff Point, N. Y., September 22-24.

RAILWAY STOREKEEPERS' ASSOCIATION.—J. P. Murphy, Box C, Collinwood, Ohio.

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 2136 Oliver Bldg., Pittsburgh, Pa. Meetings with M. C. B. and M. M. Associations. Atlantic City, June 10 to 17.

RAILWAY TELEGRAPH & TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 50 Church St., New York. Meetings with Assoc. of Ry. Teleg. Supts.

RICHMOND RAILROAD CLUB.—F. O. Robinson, C. & O., Richmond, Va.; 2d Monday in month, except June, July and August.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—L. C. Ryan, C. & N. W., Sterling, Ill. Next convention, September 8-10, 1914, Chicago.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo.; 2d Friday in month, except June, July and Aug., St. Louis.

SALT LAKE CITY TRANSPORTATION CLUB.—R. E. Rowland, Hotel Utah Bldg., Salt Lake City, Utah; 1st Saturday of each month, Salt Lake City.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, 3868 Park Ave., New York. Meeting with annual convention Railway Signal Association.

SOCIETY OF RAILWAY FINANCIAL OFFICERS.—Carl Nyquist, La Salle St. Station, Chicago.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—E. W. Sandwich, A. & W. P. Ry., Atlanta, Ga. Next meeting, July 16, Chattanooga, Tenn.

SOUTHERN & SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, Grant Bldg., Atlanta, Ga.; 3d Thurs., Jan., March, May, July, Sept., Nov., 10 A. M., Candler Bldg., Atlanta.

TOLEDO TRANSPORTATION CLUB.—J. S. Marks, Agent, Interstate Despatch, Toledo, Ohio; 1st Saturday in month, Boody House, Toledo.

TRACK SUPPLY ASSOCIATION.—W. C. Kidd, Ramapo Iron Works, Hillsburn, N. Y. Meetings with Roadmasters' and Maintenance of Way Association.

TRAFFIC CLUB OF CHICAGO.—W. H. Wharton, La Salle Hotel, Chicago.

TRAFFIC CLUB OF NEW YORK.—C. A. Swope, 291 Broadway, New York; last Tuesday in month, except June, July and August, Waldorf-Astoria, New York.

TRAFFIC CLUB OF PITTSBURGH.—D. L. Wells, Erie R. R., Pittsburgh, Pa.; meetings bimonthly, Pittsburgh. Annual meeting, 2d Monday in June.

TRAFFIC CLUB OF ST. LOUIS.—A. F. Versen, Mercantile Library Building, St. Louis, Mo. Annual meeting in November. Noonday meetings October to May.

TRAIN DESPATCHERS' ASSOCIATION OF AMERICA.—J. F. Mackie, 7122 Stewart Ave., Chicago. Next convention, June 16, Jacksonville, Fla.

TRANSPORTATION CLUB OF BUFFALO.—J. M. Sells, Buffalo; first Saturday after first Wednesday.

TRANSPORTATION CLUB OF DETROIT.—W. R. Hurley, Supt.'s office, L. S. & M. S., Detroit, Mich.; meetings monthly, Normandie Hotel, Detroit.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, N. Y. C. & H. R., East Buffalo, N. Y. Next meeting, August, Chicago.

UTAH SOCIETY OF ENGINEERS.—Frank W. Moore, Newhouse Bldg., Salt Lake City, Utah; 3d Friday of each month, except July and August, Consolidated Music Hall, Salt Lake City.

WESTERN CANADA RAILWAY CLUB.—W. H. Rosevear, P. O. Box 1707, Winnipeg, Man.; 2d Monday, except June, July and August, Winnipeg.

WESTERN RAILWAY CLUB.—J. W. Taylor, 1112 Karpen Building, Chicago; 3d Tuesday of each month, except June, July and August, Karpen Building, Chicago.

WESTERN SOCIETY OF ENGINEERS.—J. H. Warder, 1735 Monadnock Block, Chicago; regular meeting 1st Monday in month, except January, July and August, Chicago. Extra meetings, except in July and August, generally on other Monday evenings.

REVENUES AND EXPENSES OF RAILWAYS

NINE MONTHS OF FISCAL YEAR ENDING JUNE 30, 1914—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
					Maintenance										
		Freight.	Passenger.	Total. inc. misc.	Way and structures.	Of equipment.	Traffic.	Trans-portation.	General.	Total.					
Detroit, Toledo & Ironton	441	$944,626	$106,166	$1,155,147	$327,037	$382,217	$23,094	$749,888	$52,669	$1,534,905	—$379,758	.....	$51,300	—$431,058	$452,362
Duluth & Iron Range	279	4,786,110	225,648	5,099,395	654,915	596,749	10,466	1,252,649	135,942	2,650,721	2,448,674	—$11,200	274,266	2,163,208	—129,360
Duluth, Missabe & Northern	359	5,490,191	288,673	5,843,803	824,468	798,076	21,090	1,243,034	135,022	3,021,690	2,822,113	15,941	331,596	2,506,458	—186,395
Duluth, South Shore & Atlantic	627	1,585,850	844,880	2,600,310	557,066	314,880	77,290	991,681	98,373	2,039,290	561,020	5,738	178,835	387,923	48,292
Duluth, Winnipeg & Pacific	181	1,124,487	219,641	1,368,867	218,452	237,905	18,169	518,002	51,954	1,044,482	324,385	.....	68,467	255,918	19,231
El Paso & Southwestern Co.	991	5,457,010	921,523	6,668,485	1,002,413	936,411	148,675	1,917,413	234,475	4,239,387	2,429,098	—19,894	372,592	2,036,612	—419,506
Elgin, Joliet & Eastern	800	8,269,590	37	8,843,947	1,299,873	1,898,094	52,396	2,641,369	192,862	6,084,594	2,759,353	.....	312,349	2,447,004	—1,660,162
Erie	1,988	28,986,893	7,193,448	39,379,901	4,736,509	7,755,951	944,699	14,304,288	983,699	28,725,146	10,654,655	—26,030	1,423,940	8,969,685	—3,151,306
Florence & Cripple Creek	87	743,281	160,929	921,622	114,658	86,161	18,833	274,945	39,815	534,412	387,210	.....	47,210	340,000	—60,514
Florida East Coast	682	1,806,005	1,621,371	3,899,417	649,908	580,406	76,718	1,340,492	104,396	2,751,920	1,147,497	—2,028	180,000	965,469	—42,099
Fort Worth & Denver City	454	2,422,704	1,149,349	3,764,520	452,129	577,625	63,734	1,535,437	142,028	2,770,953	993,567	—4,849	142,553	846,165	—445,184
Galveston, Harrisburg & San Antonio	1,338	6,102,554	2,418,042	9,021,550	1,123,256	1,690,010	310,970	3,775,545	311,398	7,211,179	1,810,371	—23,758	474,351	1,312,262	—490,765
Georgia	307	1,709,963	711,434	2,601,288	252,284	439,026	103,932	1,134,766	79,440	2,009,448	591,840	.....	25,031	566,809	287,174
Georgia, Southern & Florida	395	1,116,496	646,416	1,997,911	247,429	393,190	75,322	815,426	92,087	1,623,454	374,457	—927	102,680	270,850	—55,991
Grand Rapids & Indiana	576	2,452,654	1,464,196	4,227,453	578,403	668,662	112,105	1,873,460	142,067	3,374,697	852,756	—3,831	217,047	631,878	—134,394
Grand Trunk Western	347	3,368,102	1,672,782	5,363,971	595,479	991,465	200,845	2,536,355	161,900	4,486,044	877,927	—16,389	283,500	578,038	—573,012
Great Northern	7,774	42,612,076	11,728,554	58,294,720	7,856,568	7,519,895	999,491	16,298,675	1,067,828	33,742,457	24,552,263	105,264	3,323,427	21,334,100	—1,900,087
Gulf & Ship Island	308	1,144,846	303,792	1,545,544	199,128	301,752	26,652	424,114	76,668	1,028,314	517,230	—42	67,761	449,427	—51,038
Gulf, Colorado & Santa Fe	1,596	7,145,739	2,318,207	10,056,497	1,620,214	1,578,267	235,236	3,884,212	301,613	7,619,542	2,436,955	.....	465,931	1,971,024	—707,289
Hocking Valley	352	4,622,261	705,804	5,707,288	552,539	1,221,638	83,765	1,910,921	133,081	3,901,944	1,805,344	.....	361,200	1,444,144	—217,686
Houston, East & West Texas	191	725,998	308,975	1,096,856	162,428	113,816	17,216	471,980	37,562	803,002	293,854	.....	46,264	247,590	—20,344
Houston & Texas Central	789	3,416,970	1,425,437	5,203,087	786,306	736,487	133,823	2,364,122	165,717	4,186,455	1,016,632	—1,453	266,066	749,113	—318,015
Illinois Central	4,763	33,832,558	10,543,284	50,661,749	6,903,924	10,955,126	979,518	18,526,741	1,233,840	38,599,149	12,062,600	—9,685	2,469,490	9,583,425	827,470
Indiana Harbor Belt	105	.....	.....	2,440,710	331,519	293,960	26,134	1,180,248	70,194	1,902,055	538,655	20,166	57,541	501,280	—165,299
International & Great Northern	1,160	5,623,094	1,755,700	7,902,560	1,228,936	959,719	242,713	3,424,535	301,144	6,157,047	1,745,513	—15,939	254,841	1,474,733	—663,217
Kanawha & Michigan	177	2,082,853	286,353	2,426,490	326,772	560,140	25,811	747,069	63,261	1,723,053	703,437	—64	93,250	610,123	—165,097
Kansas City Southern	827	6,088,016	1,289,886	8,191,613	808,751	995,296	242,597	2,762,300	324,410	5,133,354	3,058,259	.....	387,447	2,670,812	—77,745
Lake Erie & Western	906	3,456,158	658,915	4,373,629	690,607	905,945	129,869	1,796,728	109,617	3,632,766	740,863	.....	195,640	545,223	—411,228
Lake Shore & Michigan Southern	1,857	26,234,462	9,820,881	40,820,566	5,333,523	9,700,601	775,776	14,862,987	878,439	31,551,326	9,269,240	33,646	1,819,712	7,483,174	—6,578,792
Lehigh & Hudson River	97	1,211,043	38,208	1,318,333	219,833	211,412	12,734	527,882	37,759	1,009,620	308,713	.....	36,000	272,713	—142,111
Lehigh & New England	286	1,416,803	10,695	1,484,624	197,533	205,928	18,214	407,539	35,305	864,519	620,105	.....	28,607	591,498	245
Lehigh Valley	1,439	24,576,717	3,606,105	29,270,424	3,438,780	5,366,071	754,796	10,674,233	695,561	20,929,441	8,340,983	—245,096	1,149,000	6,946,887	—2,314,537
Long Island	398	2,449,079	5,728,281	9,155,359	1,180,802	1,084,367	138,464	4,112,430	250,848	6,766,911	2,388,448	—23,817	583,090	1,781,541	—373,746
Louisiana & Arkansas	273	1,034,050	207,570	1,283,218	239,946	190,904	22,647	331,380	47,451	832,328	450,890	.....	47,983	402,907	—25,031
Louisiana Ry. & Navigation	351	1,180,300	221,369	1,495,001	281,669	179,096	55,926	613,399	61,676	1,191,766	303,235	.....	58,250	244,985	—77,937
Louisiana Western	208	1,109,128	559,892	1,753,040	179,688	374,059	67,028	562,962	59,655	1,243,392	509,648	—7,549	93,881	408,218	—84,297
Louisville & Nashville	4,923	33,128,030	10,041,925	46,004,197	7,036,959	9,288,973	989,767	15,685,358	942,306	33,943,363	12,060,834	18,793	1,576,108	10,503,519	—267,751
Louisville, Henderson & St. Louis	200	657,563	305,919	1,027,236	204,275	133,742	42,444	357,170	28,935	766,566	260,670	2,015	32,400	230,285	112,240
Maine Central	1,207	5,608,386	2,658,101	8,811,643	1,265,150	1,343,135	107,631	3,479,399	253,523	6,448,838	2,362,805	—31,895	441,650	1,889,260	—195,147
Michigan Central	1,800	16,504,079	6,975,492	25,984,093	3,635,284	4,633,945	578,456	11,476,238	509,259	20,833,182	5,150,911	—25,711	1,094,814	4,030,386	—2,663,300
Midland Valley	373	824,850	370,324	1,262,285	279,382	233,345	27,442	453,433	56,530	1,045,132	217,153	280	59,061	158,372	—5,363
Minneapolis & St. Louis	1,586	5,507,491	1,480,189	7,408,840	974,242	1,022,860	160,031	2,847,227	177,894	5,182,254	2,226,586	—332	304,686	1,921,568	—194,836
Minneapolis, St. Paul & S. S. Marie	3,978	15,869,117	5,201,589	22,386,431	2,618,274	3,417,027	489,058	7,388,354	484,866	14,397,579	7,988,852	106,493	905,784	7,189,561	—2,293,049
Missouri & North Arkansas	365	613,934	323,381	997,570	250,890	186,243	33,516	401,352	51,060	•923,061	74,509	.....	49,500	25,009	33,386
Missouri, Kansas & Texas System	3,817	15,968,511	7,124,144	24,783,148	3,724,701	3,091,931	554,214	9,649,831	908,573	17,929,250	6,853,898	—102,631	1,147,602	5,603,665	—1,523,859
Missouri, Oklahoma & Gulf	332	711,154	191,666	939,776	201,609	151,048	48,712	446,985	64,311	913,565	26,211	3,639	54,923	—25,073	—91,059
Missouri, Okla. & Gulf Ry. Co. of Texas	19	90,451	5,011	96,896	10,580	15,966	1,638	50,277	7,639	86,100	10,796	.....	1,802	8,994	8,046
Missouri Pacific	3,920	15,073,780	3,680,868	20,478,741	3,192,893	3,805,367	523,968	8,687,192	620,999	16,830,419	3,648,322	—31,752	870,740	2,745,830	—580,029
Mobile & Ohio	1,122	7,989,393	1,167,642	9,729,829	1,140,271	1,967,895	370,982	3,726,420	299,804	7,505,372	2,224,457	—12,511	312,054	1,899,892	—318,831
Monongahela	67	1,066,995	24,989	1,109,620	134,465	64,028	3,752	230,522	19,512	452,279	657,341	.....	20,900	636,441	—111,572
Monongahela Connecting	6	.....	.....	741,918	75,026	135,708	2,700	356,848	23,330	593,612	148,306	.....	24,708	123,598	—70,842
Morgan's La. & Texas R. R. & S. S. Co.	405	2,474,162	889,327	3,642,838	449,447	562,197	109,621	1,475,732	113,913	2,710,910	931,928	—12,871	218,926	700,131	248,776
Nashville, Chattanooga & St. Louis	1,231	6,675,247	2,356,075	9,728,912	1,525,040	1,858,544	382,386	3,683,735	290,640	7,740,345	1,988,567	—7,013	236,180	1,745,374	—256,900
Nevada Northern	165	1,195,073	1,113,92	1,337,716	149,527	175,707	4,000	314,493	42,588	686,315	651,401	.....	69,213	582,188	7,820
New Orleans & North Eastern	204	2,314,972	493,067	3,025,208	308,793	655,179	91,773	1,149,962	118,178	2,323,885	701,323	—4,200	139,763	557,360	3,044
New Orleans Great Northern	283	1,013,188	298,444	1,425,112	193,487	154,833	24,143	412,864	68,124	853,451	571,661	—762	23,960	546,939	59,941
New Orleans, Mobile & Chicago	403	1,312,589	283,295	1,690,851	236,528	191,778	34,184	539,306	71,183	1,072,979	617,872	—964	67,055	549,853	34,876
New Orleans, Texas & Mexico	286	976,165	164,840	1,212,531	342,797	115,467	29,964	479,557	81,535	1,049,320	163,211	.....	11,546	151,665	—102,439
New York Central & Hudson River	3,753	49,941,546	26,348,303	85,631,930	12,335,414	17,333,337	1,642,327	32,497,514	2,241,231	66,049,823	19,582,107	—202,282	4,533,739	14,846,086	—4,141,980
New York, Chicago & St. Louis	566	7,579,736	1,204,960	9,087,818	1,133,530	1,443,030	439,179	4,188,084	173,199	7,377,022	1,710,796	—25,442	348,214	1,337,140	—1,015,065
New York, New Haven & Hartford	2,056	24,103,575	20,634,312	49,750,317	6,190,893	7,657,939	359,168	20,659,023	1,346,133	36,213,156	13,537,161	69,036	2,690,000	10,916,197	—3,626,859
New York, Ontario & Western	566	5,076,833	1,344,740	6,758,703	999,954	1,206,396	92,476	2,649,640	150,931	5,099,397	1,659,306	—21,817	170,000	1,467,189	—583,460
New York, Philadelphia & Norfolk	112	2,210,108	394,057	2,799,546	245,689	610,998	45,451	1,285,692	126,017	2,313,847	485,699	.....	77,100	408,599	—185,338

REVENUES AND EXPENSES OF RAILWAYS

NINE MONTHS OF FISCAL YEAR ENDING JUNE 30, 1914—CONTINUED

Name of road.	Average mileage operated during period.	Operating revenues			Operating expenses						Net operating revenue (or deficit).	Outside operations, net.	Taxes.	Operating income (or loss).	Increase (or decr.) comp. with last year.
		Freight.	Passenger.	Total. inc. misc.	Maintenance: Way and structures.	Maintenance: Of equipment.	Traffic.	Transportation.	General.	Total.					
New York, Susquehanna & Western	148	$1,568,449	$410,948	$2,211,980	$257,738	$281,455	$20,724	$943,623	$63,944	$1,567,484	$644,496	—$24,008	$133,512	$486,976	—$14,173
Norfolk & Western	2,036	28,515,324	3,723,228	33,433,947	3,763,660	6,996,719	549,296	10,709,162	694,202	22,715,039	10,718,908	—14,243	1,200,000	9,504,665	—1,341,842
Norfolk Southern	838	1,993,107	726,430	2,956,036	405,634	400,282	52,626	1,034,905	155,686	2,049,133	906,903	3,366	93,858	816,411	—147,364
Northern Central	472	7,374,713	1,910,717	9,963,219	1,274,894	2,295,092	156,165	4,993,465	253,795	8,973,411	989,808	5,590	374,674	620,724	—586,320
Northern Pacific	6,313	37,276,944	12,056,345	52,668,371	6,725,194	6,428,972	932,897	17,149,239	809,399	32,045,701	20,622,670	280,484	3,619,820	17,283,334	—2,519,988
Northwestern Pacific	401	1,096,741	1,466,367	2,772,700	446,071	369,462	35,429	1,012,405	107,386	1,970,753	801,947	.....	136,298	665,649	—57,118
Oahu Ry. & Land Co.	102	637,168	231,485	925,688	94,391	72,844	5,807	203,723	44,973	421,738	503,950	.....	64,949	439,001	—7,309
Oregon Short Line	2,052	12,128,199	3,764,586	16,997,635	2,075,938	2,150,761	331,076	4,338,999	492,369	9,389,143	7,608,492	—22,395	1,179,873	6,406,224	—847,553
Oregon-Washington R. R. & Nav. Co.	1,915	8,640,225	3,749,905	13,358,491	1,873,174	1,589,618	451,061	4,653,732	540,340	9,107,925	4,250,566	—45,424	1,005,647	3,199,495	—524,975
Pecos & Northern Texas	492	1,380,877	349,447	1,832,760	186,978	327,317	25,229	564,295	60,753	1,164,572	668,188	.....	68,503	599,685	25,376
Pennsylvania *Co.*	1,750	34,616,832	7,685,863	46,883,019	6,538,471	8,953,704	795,282	18,098,924	1,051,476	35,437,857	11,445,162	—97,929	2,450,572	8,896,661	—2,292,120
Pennsylvania *Railroad*	4,044	98,293,583	28,592,284	136,631,419	18,232,799	28,602,219	1,923,370	51,559,691	3,420,322	103,738,401	32,893,018	—1,467,196	5,554,483	25,871,339	—3,300,004
Pere Marquette	2,322	8,379,935	3,061,075	12,553,756	1,895,015	3,036,169	308,319	5,526,684	376,009	11,142,196	1,411,560	—26,879	464,710	919,971	—1,683,166
Philadelphia & Reading	1,020	28,612,426	5,306,128	35,573,870	3,581,680	6,632,812	391,660	12,356,370	575,395	23,537,917	12,035,953	172,610	924,199	11,284,364	—3,654,076
Philadelphia, Baltimore & Washington	717	7,499,352	6,266,235	15,378,773	2,457,077	2,919,274	300,086	6,917,188	428,822	13,022,447	2,356,326	.....	491,024	1,865,302	—781,645
Pittsburgh & Lake Erie	223	11,746,029	1,378,392	13,603,101	1,414,212	2,875,300	144,617	3,543,917	268,443	8,246,489	5,356,612	—3,858	529,385	4,823,369	—2,335,017
Pittsburgh, Cincinnati, Chic. & St. Louis	1,472	22,236,042	6,710,738	32,586,546	4,784,175	6,648,002	663,037	12,985,141	704,006	25,784,361	6,802,185	—6,006	1,419,277	5,376,902	—1,773,804
Pittsburgh, Shawmut & Northern	282	1,605,179	97,146	1,725,792	318,861	462,229	15,389	618,537	46,048	1,461,064	264,728	.....	16,478	242,250	—152,046
Port Reading	21	984,699	.....	1,012,545	120,133	1,077	350	342,930	3,540	468,030	544,515	33,921	117,000	461,436	—302,481
Richmond, Fredericksburg & Potomac	88	1,070,074	779,610	2,113,727	213,086	253,579	29,019	815,737	66,284	1,377,705	736,022	—12,278	73,780	649,964	—150,975
Rutland	468	1,467,104	954,783	2,798,600	323,570	539,275	82,215	1,124,006	57,718	2,126,784	671,816	394	155,653	516,557	6,804
St. Joseph & Grand Island	319	874,268	268,568	1,243,836	224,419	186,486	45,200	535,361	55,781	1,047,247	196,589	—9	65,337	131,243	50,634
St. Louis & San Francisco	4,742	22,405,722	8,278,512	32,942,548	5,033,250	5,475,573	651,183	11,182,090	912,609	23,254,705	9,687,843	.....	1,082,299	8,605,544	—1,875,977
St. Louis, Brownsville & Mexico	518	1,169,205	651,840	1,991,839	449,755	217,230	43,266	762,218	97,594	1,570,063	421,776	.....	69,729	352,047	—33,946
St. Louis, Iron Mountain & Southern	3,365	18,925,818	4,841,763	25,550,528	3,392,080	3,916,285	487,729	7,738,218	666,317	16,200,629	9,349,899	—20,808	961,246	8,367,845	432,493
St. Louis Merchants' Bridge Terminal	9	.....	3,190	1,494,599	286,536	99,958	6,579	806,208	55,471	1,254,752	239,847	.....	54,401	185,446	—126,844
St. Louis, San Francisco & Texas	244	837,619	294,026	1,202,115	238,354	180,436	20,976	499,113	50,806	989,685	212,430	.....	13,940	198,490	—75,432
St. Louis Southwestern	918	4,972,195	1,133,353	6,452,400	603,119	1,160,473	265,110	1,605,584	256,161	3,890,447	2,561,953	—12,124	284,901	2,264,928	—438,815
St. Louis Southwestern of Texas	811	2,427,731	970,667	3,664,366	858,848	883,853	123,077	1,526,253	186,881	3,578,912	85,454	—2,293	165,761	—82,600	—485,469
San Antonio & Aransas Pass	724	2,480,089	1,054,150	3,738,795	817,537	560,512	57,736	1,515,275	107,258	3,058,318	680,477	.....	126,000	554,477	—588,029
San Pedro, Los Angeles & Salt Lake	1,133	4,945,477	2,269,386	7,774,580	934,742	1,305,190	286,007	2,672,439	165,088	5,363,466	2,411,114	—26,968	377,689	2,006,456	—254,416
Seaboard	3,082	13,027,613	4,152,827	19,067,876	2,419,425	2,575,990	589,607	6,980,622	562,512	13,128,156	5,939,720	—11,615	738,000	5,190,105	225,681
Southern Railway	7,037	34,569,273	14,472,411	53,169,848	6,906,633	8,883,480	1,666,549	18,774,270	1,609,129	37,840,061	15,329,787	36,949	1,980,866	13,385,870	—835,871
Southern in Mississippi	281	606,600	345,452	1,032,300	224,292	97,156	22,174	421,774	36,537	801,933	230,367	.....	77,614	152,753	114,430
Southern Kansas of Texas	179	799,593	141,768	984,986	115,888	195,105	14,150	308,307	32,988	666,438	318,548	.....	34,785	283,763	—120,220
Southern Pacific Co.	6,394	41,259,620	22,789,049	69,246,277	8,041,163	9,865,757	1,423,804	19,926,230	2,107,552	41,364,506	27,881,771	903,523	3,770,787	25,014,507	—3,809,830
Spokane International	163	565,166	180,486	778,019	115,496	48,345	17,443	235,005	34,626	450,915	327,104	.....	32,233	294,871	—38,993
Spokane, Portland & Seattle	556	2,193,418	1,225,030	3,722,564	541,161	340,654	71,366	938,925	119,642	2,011,748	1,710,816	—881	480,600	1,229,335	—334,012
Tennessee Central	294	884,250	330,102	1,287,826	240,545	150,139	51,038	453,149	65,626	960,497	327,329	.....	38,226	289,103	8,847
Terminal R. R. Assn. of St. Louis	34	.....	1,877	2,180,725	336,212	170,379	8,374	865,178	51,525	1,431,668	749,057	71,762	255,213	565,606	—128,968
Texas & New Orleans	458	2,038,938	951,869	3,194,462	550,614	732,263	77,473	1,340,613	119,071	2,820,034	374,428	9,202	174,409	209,221	—91,917
Texas & Pacific	1,885	10,020,941	3,632,824	14,641,873	1,701,627	2,236,435	337,784	6,180,249	388,170	10,844,265	3,797,608	—33,408	544,541	3,219,659	681,077
Toledo & Ohio Central	444	3,781,185	505,042	4,519,925	782,978	922,823	73,465	1,797,471	95,098	3,671,835	848,090	—4,837	189,283	653,970	—286,449
Toledo, Peoria & Western	248	569,483	380,241	1,009,799	197,064	256,666	22,417	452,497	33,102	961,746	48,053	.....	54,000	—5,947	—173,597
Toledo, St. Louis & Western	451	3,008,213	280,213	3,504,644	358,095	473,521	148,052	1,346,727	83,220	2,409,615	1,095,029	.....	148,300	946,729	26,174
Trinity & Brazos Valley	463	1,415,620	425,208	1,921,249	490,259	274,761	91,128	931,447	111,282	1,898,877	22,372	.....	51,467	—29,095	—382,537
Ulster & Delaware	129	463,144	274,065	779,453	110,672	115,185	12,497	355,921	35,310	629,585	149,868	481	31,500	118,849	—69,275
Union Pacific	3,613	27,639,081	8,058,909	39,425,709	3,979,598	5,494,494	942,561	10,700,487	1,133,145	22,250,285	17,175,424	—94,109	1,695,443	15,385,872	—1,263,485
Union R. R. of Baltimore	9	1,006,855	204,503	1,229,296	129,649	.....	7,622	45,164	23,485	205,970	1,023,376	.....	53,621	969,755	—142,572
Union R. R. of Pennsylvania	31	.....	.....	3,171,488	425,983	900,162	913	1,441,740	39,764	2,808,562	362,926	38,627	81,500	320,053	—640,177
Vandalia	910	6,004,714	1,909,851	8,835,949	1,120,358	1,702,304	237,649	3,512,406	186,782	6,759,499	2,076,450	.....	284,873	1,791,577	—86,552
Vicksburg, Shreveport & Pacific	171	817,071	451,066	1,384,611	224,557	267,796	31,963	475,628	47,856	1,047,800	336,811	—2,178	62,262	272,371	925
Virginia & Southwestern	240	1,284,340	140,545	1,465,506	200,528	353,788	19,370	420,884	35,889	1,030,459	435,047	.....	56,932	378,115	22,063
Virginian	503	4,380,541	290,296	4,795,541	613,766	780,948	49,565	1,132,149	91,021	2,667,449	2,128,092	62,191	198,095	1,992,188	244,089
Wabash	2,515	15,584,218	5,509,963	23,111,758	2,813,076	4,277,532	776,720	9,745,851	632,819	18,245,998	4,865,760	—44,975	746,735	4,074,050	—843,469
Washington Southern	36	322,250	385,238	941,576	124,696	130,576	12,462	389,024	28,315	685,073	256,503	—2,001	31,464	223,038	—56,861
West Jersey & Seashore	356	1,342,899	3,136,093	4,784,574	778,919	796,972	150,403	2,109,298	123,234	3,958,826	825,748	—31,120	235,972	558,656	—361,902
Western Maryland	661	5,135,206	792,291	6,202,432	1,081,237	1,249,262	211,633	2,963,823	194,275	5,700,230	502,202	.....	199,100	303,102	—844,029
Western Pacific	938	3,657,332	918,599	4,902,114	997,200	606,966	252,429	1,751,855	235,932	3,844,382	857,732	—19,840	296,112	541,780	—511,035
Western Ry. of Alabama	133	656,106	420,836	1,163,829	199,610	222,650	55,813	325,119	52,309	855,501	308,328	590	44,649	264,269	—9,916
Wheeling & Lake Erie	459	5,392,670	484,104	6,228,750	829,072	1,054,884	83,834	2,111,379	164,852	4,244,021	1,984,729	—867	281,050	1,702,812	144,420
Yazoo & Mississippi Valley	1,372	7,058,563	2,281,600	9,976,340	1,344,995	1,365,877	139,732	3,581,450	246,923	6,678,977	3,297,363	—1,860	408,000	2,887,503	1,198,487

Traffic News

The principal railroads operating in Virginia, after a conference with the governor of the state, have agreed to see that the agricultural and industrial resources of that state are properly exhibited at the Panama-Pacific Exposition in San Francisco next year. The legislature of the state made no adequate appropriation for this purpose. M. V. Richards, industrial agent of the Southern Railway, will act for all of the roads.

The Panama Canal is already open, informally. It was made passable for barges this week, and on Monday a tow of five barges loaded with eastbound freight went through from the Pacific to the Atlantic. By reason of the suspension of traffic on the Tehuantepec Railroad, because of the revolution in Mexico, the Panama Railroad has been offered more freight than it can carry, and the officer in charge of the canal therefore allowed the barges to be taken through as soon as the channel at Cucharaca slide had been made passable.

The Southern Railway, in handling 48 special trains into Atlanta, and 35 special trains out, bearing Shriners to their annual meeting, and in adding many extra sections to regular trains, moved all practically on schedule time, and without accident. The departure of the special trains was accomplished absolutely without congestion or confusion, and not a single robbery or attempt at robbery was reported. The parking places were occupied by 150 Pullman cars in which between 3,000 and 4,000 Shriners lived while in Atlanta. Every special train was accompanied by an operating officer and a passenger representative; and the crew of every train was personally inspected by officers before going on the run.

J. P. Jackson, president of the Cattle Raisers' Association of Texas, has addressed a letter of protest to the Interstate Commerce Commission regarding the tariffs imposing a charge for "spotting" cars which have been filed with the commission by the eastern railways. Mr. Jackson asks, in behalf of the association, that the tariffs be suspended until it may be determined whether the charges are reasonable. The letter states that if the general principle is established in the east it is not unlikely that the commission would extend it to the west. The association demands that its case be heard in connection with the proposed charges at markets east of the Mississippi river.

The western roads have held several meetings recently in Chicago to consider the possibility of making advances in freight rates, and the traffic officers are now checking the tariffs to pick out those commodities on which it will be practicable to make advances. No general or horizontal increase is contemplated, unless the Interstate Commerce Commission should favor such a course in its decision in the eastern rate case, now pending. The general opinion of the traffic officers on the western situation does not favor a horizontal increase. The bases of rates in the west are varied and many rates are held down by intrastate tariffs or by recent decisions of the Interstate Commerce Commission. Therefore the work of the traffic officers will be directed to the planning of a leveling-up process.

The Louisville & Nashville on June 1 will put in effect the reduced rates on grain prescribed by the Kentucky State Railroad Commission about three years ago, and which have been suspended by reason of an injunction secured by the road in the federal court. The United States Supreme Court has sustained the commission, and the road loses its suit. The railroad made rates on grain to 19 distilleries on a low basis, in consideration of the profit to be secured on the whisky forwarded from those distilleries; and when the state commission ruled that these low rates must be made permanent and open to all, the railroad contested the action in the courts. It appears that the road did not overcome the presumption entertained by the court, that the voluntary maintenance of these rates for a long time afforded sufficient evidence that they were reasonable.

The Long Island Railroad, the president of which is one of the chief promoters of agriculture on Long Island, has offered about 20 prizes to be given at the Suffolk county fair the coming autumn, the prizes varying from $20 for the best milch cow and the same for the best nine cauliflowers to $5 for the third best collection of preserves, the last named for women only.

The Northern Pacific has offered a large number of prizes to be awarded at the State Fair in Montana this year, the highest prize being $100 for the best collection of grains, the object of the company being to gather samples of the products of Montana to be exhibited in eastern states. The best collection of forage, which must include at least six varieties, will receive $50. For the best collection of six jars of canned fruit, the company will give a mammoth fruit cake, to be made by one of the road's dining car cooks. Three gold medals are to be given to boys and girls on the farms of the state, one each to the champion in the potato, corn and sewing contests. A large number of bronze medals also will be given and, from the experience of last year, it is expected that there will be 5,000 entrants for the prizes.

The railways in Trunk Line and Central Traffic territory have filed tariffs, to go into effect June 1, making numerous changes in the rates and regulations for special trains and in the charges for transporting theatrical troups and similar organizations. Under present arrangements the special rate for parties of 100 or more on a round-trip movement within 250 miles is 3 cents a mile, one-way distance, the trip to be completed within five days. The new regulations make no change in the mileage rate, but limit the distance to 200 miles, while the entire journey must be completed within 24 hours. This rate does not include baggage. A charge for a baggage car will be made at the rate of 30 cents a mile, with a minimum of $25. The present rule allows one baggage car free for each 100 full fares. The basis for special trains, $2 per mile, or, on a round-trip movement to be completed within 24 hours, $1.50 per mile, with a minimum charge in either case of $50, is changed so that not less than 100 one-way party fares must be paid for a one-way movement, or 100 one-way party fares in each direction for a round-trip movement. The rate for a round-trip movement of a special passenger car has been advanced to the per capita fare for each passenger with a minimum of 25 adult one-way party fares, the charge to be not less than $25.

Three Thousand Farmers

The department of development of the St. Louis & San Francisco reports that for the six months ending with March, last, 2,934 farmers were located along its lines; these farmers brought with them 1,997 cars of farm equipment; and purchased 333,765 acres of land or an area of 521 square miles. The large percentage of this development has taken place in the Ozark section of Missouri, which, according to the figures of the department, has received almost 50 per cent. of the total immigration coming on to the railroad. This development has been carried on without the usual home-seekers' rush or excitement. The present policy of the Frisco is to actually develop its agricultural territory by assisting the communities along its lines in bringing in farmers of a class that are equipped to develop it; men who would be assets to the communities and increase the production of the soil. The agricultural branch of the department is engaged not only with these newcomers, but with farmers already on the land, in employing such methods as will bring maximum production and profits. The local bankers are engaged with the Frisco in this work, and, as recently stated by President Clarke of the Ozark Bankers' Development Committee, there are nearly 1,200 bank officers in the Ozarks engaged with the railroads and the farmers in developing agriculture.

Slag Ballast in Germany.—Slag is very largely used as railway ballast in the district of Lorraine. About 250 miles, or two-thirds of the total mileage, are ballasted more or less completely with that material. It is used chiefly on roads that have been constructed or re-ballasted in recent years and especially on the roads over which traffic is heavy. On smaller, less used lines where the traffic is light, gravel or whatever suitable material is at hand is used. Slag costs about 14½ cents per cu. yd. at the furnace. It is regarded as economical ballast within a radius of 15 to 30 miles, but cannot compete with rock at a greater distance than that on account of the cost of transportation, except, of course, in places where no suitable rock ballast is to be found. It is said that the slag is far superior to gravel as ballast and that it is equal to the best variety of rock.

Commission and Court News

INTERSTATE COMMERCE COMMISSION

The commission on Wednesday last announced its refusal to rehear the industrial railways' case on the application of companies representing the United States Steel Corporation and various other iron and steel corporations. The decision that the allowances were unlawful was reaffirmed.

Rates on Lime and Plaster in the Northwest

Pacific Coast Gypsum Company et al. v. Oregon-Washington Railroad & Navigation Company et al. Opinion by Commissioner Clements:

The commission does not find discriminatory an arrangement whereby there are higher rates and a more restricted mixing privilege on shipments of lime, plaster and plaster products from Seattle and Tacoma to Portland and points to the north thereof than on shipments from Lime and Gypsum, Ore. The rates from the latter, which are more competitive, should not be used as the measure for rates eastbound. It is held, however, that certain rates from the Puget Sound points to points east of Portland upon a scale in some cases twice as high as in the reverse direction are not justified and that the rates from Seattle and Tacoma to Huntington should not exceed 24 cents on lime and 27 cents on plaster, with rates to intermediate points graded up to those amounts. In like manner the rates from Seattle and Tacoma to Bend should not exceed those to Sherman by more than 7½ cents per 100 lb. (30 I. C. C., 135.)

Increases in Iron and Steel Rates Permitted

In re rates on iron and steel articles between Chicago, St. Louis, St. Paul and other points and Des Moines, Sioux Falls and other points. Opinion by Commissioner Clements:

The commission finds that the carriers have justified proposed increases ranging from one to one and one-half cents per 100 lb. in the rates on iron and steel articles from Chicago and in the proportional rates from the Mississippi river on traffic originating east of the Indiana-Illinois state line to points in Iowa. The increases will result in a better alinement with the rates from Chicago to St. Paul and those via the lake and rail routes. The proposed rates compare favorably with the fifth class rates established as a result of the finding in *Cedar Rapids Commercial Club* v. *C. R. I. & P.*, and are not higher proportionately to distance than the general basis of rates east of the Mississippi. Increases from 8½ to 10 cents in the rates on scrap iron from Sioux Falls and Sioux City to St. Paul, and from 14½ to 15 cents from Omaha to St. Paul are likewise allowed. (30 I. C. C., 337.)

STATE COMMISSIONS

Hearings were held before the Minnesota Railroad & Warehouse Commission last week on protests of lumbermen against the proposed application by the railways of the Cashman distance tariff law to the lumber rates, which would have resulted in a slight advance in rates to St. Paul.

The Illinois Public Utilities Commission held a hearing on May 12, on the complaint of eight industrial lines operating in the state against the proposed cancellation by the trunk lines of allowances heretofore paid to the industrial lines. A large number of independent shippers protested that their rates would be substantially increased by the cancellation, which has been suspended until July 30 by both the Illinois Public Utilities Commission and the Interstate Commerce Commission. The hearing was continued until June 10.

The Public Service Commission of the state of Washington has issued an order in connection with the distributive freight rate case, which has been pending before it since June, 1909, granting permission to the Great Northern to file and publish tariffs conformable to its amended petition. The order is to be effective upon the dismissal of certain cases in the federal courts. Class rates generally in the state will be reduced about 25 per cent., and a large number of other readjustments will also be made.

Suspension of Industrial Road Allowances in Pennsylvania Forbidden

The Public Service Commission of Pennsylvania, on complaint of two short railroads and a number of shippers in and near Pittsburgh, has ordered the Baltimore & Ohio, the Pennsylvania and the Pittsburgh & Lake Erie to continue existing rates and divisions on traffic to and from the industrial roads named, declaring void the cancellation of tariffs which had been filed by the roads with the commission. The commission is considering the subject further and is holding hearings this week. The present decision says:

"Upon the hearing the respondent common carriers rested their case upon the opinion of the Interstate Commerce Commission in the so-called Industrial Railways case, in which it was held that the complainants, the Monongahela Connecting Railroad and the Union Railroad, were to be regarded merely as plant facilities of certain industries, and that participation by them in the joint rates or allowances made to them by said respondents, in the case were unlawful as in effect constituting rebates.

"From the evidence presented this commission finds that under the law of Pennsylvania, as determined by the supreme court of the commonwealth, the Union Railroad Company is a common carrier possessed of all the rights and subject to the performance of all the duties of such common carrier, and that the legal status of the Monongahela Connecting Railroad is the same.

"Although we have given to the opinion expressed by the Interstate Commerce Commission that consideration and respect to which it is properly entitled, and although we fully appreciate the desirability of uniformity of federal and state regulation, so far as this may be maintained consistently with the law of this commonwealth, the commission is of the opinion that a conclusion at variance with that of the Supreme Court of the state of Pennsylvania with respect to the legal status of complainant railroad companies would not be justified.

"No evidence has been presented which would warrant finding that the joint rates between the respondents and the complainants, or the division of said joint rates or the allowances thereout, as heretofore for many years established and maintained, are unjust or unreasonable or unjustly discriminatory or unduly preferential; and the commission accordingly expresses no opinion at this time as to the lawfulness or unlawfulness of the amount of such divisions or allowances. . . .

"There is not sufficient evidence to warrant the finding that the increase involved in the proposed cancellation of joint rates would be just and reasonable.

"The reasons for these conclusions will be set forth more at length in an opinion which will be hereafter filed in this case."

Illinois Commission Requires Locomotive Headlights

The State Public Utilities Commission of Illinois has issued the following order:

"Pursuant to the notice given the railroads operating within the state of Illinois to show cause why they have not complied with the requirements of the law as to headlights, a large number of the said railroads, represented by their counsels and officers appeared before the commission in response to said notice. Some of said railroads reported a full compliance with the provisions of said act, while quite a number of others have taken no steps in that direction. A majority of the railroads which have not proceeded to equip their engines with the character of headlight required by said act, urged as the main reason for non-compliance that there is now a suit pending in the United States Supreme Court, which originated in the state of Georgia on an Act passed by the legislature of that state in reference to the same subject matter covered by the Act of the general assembly of the state of Illinois, with the reference to the headlights, which is the Act now in force, the non-observance of which is herein complained of.

"The Act of the Illinois legislature in force July 1, 1913, is

of that character of legislation known as a police regulation to insure public safety. The state of Illinois has the right to legislate upon that subject, and this commission will not assume that the federal courts will make any decision or ruling on that subject which will in any manner restrict the inherent right of the state to pass such laws as are deemed reasonably necessary for public safety; nor will this commission deny the people of the state the benefit of the provisions of such Act on the ground that the question of the right of the state to enact such legislation has been raised in some matter in litigation, presenting to the federal courts the question of the power of a state to legislate on that subject; nor will this commission hold that any proposed legislation in the Congress of United States, by the introduction of measures on that subject will be sufficient on which to defer action for the enforcement of the said act passed by the legislature of this state.

"We are therefore of the opinion and so hold that the railroads in operation within this state must comply with the said act of the general assembly of the state of Illinois, approved July 1, 1913, and all railroads failing to so comply with said act on or before the first day of August, 1914, will be reported to the public prosecutors of the state and prosecutions recommended by this commission."

PERSONNEL OF COMMISSIONS

Robert C. Wood, of New York City, has been appointed a member of the New York State Public Service Commission, First district, in place of John E. Eustis, whose term expired February 1. Mr. Wood has been a banker, and also has been interested in street railways in New York City and various other public utility enterprises. He is 44 years old and a graduate of Harvard University.

Frederick Mears, who has recently been appointed a member of the Alaska Railroad Commission, was born on May 25, 1878, at Omaha, Neb., and was educated at Gonzaza College, Spokane, Wash., and the Shattuck School in Minnesota. In 1897, he entered the employ of the Great Northern and worked as a rodman on the Park Rapids extension and the Coon Creek cut-off. In 1898 he became assistant engineer and took part in the work of locating the Kootnoi Valley and the Bellingham & Nelson railroads in northern Idaho and British Columbia. In 1899 he enlisted in the United States Army and saw active service in the Philippines. Two years later he became a second lieutenant, and in 1903 entered the United Staff College at Fort Leavenworth, Kan., graduating in 1905. In September of the same year he obtained leave of absence and spent four months as a resident engineer on construction work on the Chicago, Rock Island & Pacific in Arkansas. In May, 1906, he was sent to the Isthmus of Panama. He was first engaged as a track foreman, but was later given the position of assistant engineer and placed in charge of the relocation of the Panama Railroad. From 1907 to 1909 he was resident engineer and engineer of construction, becoming then chief engineer and as such having charge of maintenance and the construction of the relocated high level line. Since September, 1913, he has also been general superintendent of the railroad in charge of operation, maintenance and construction. Included in the work done under his supervision are the reconstruction of almost the entire Panama Railroad and the construction of the terminal docks at Colon.

F. Mears

Thomas Riggs, Jr., who has recently been appointed a member of the Alaska Railroad Commission, was born October 7, 1873, in Howard county, Maryland, and was educated at the Emerson Institute, Washington, and the School of Science, Princeton University. For a while he engaged in the lumber business in the state of Washington, but in 1897 went to the Klondike and was connected with various mining enterprises. In 1903 he entered the service of the United States government and was assigned to work on the United-States Canada boundary survey, becoming chief of all the field parties for the chief topographer. In July, 1906, he was made assistant engineer and transferred to the Alaska boundary survey. Mr. Riggs was engaged on that work up to the close of last season, when the work was completed. During this period the 141st meridian was marked from Mount Elias to the Arctic ocean.

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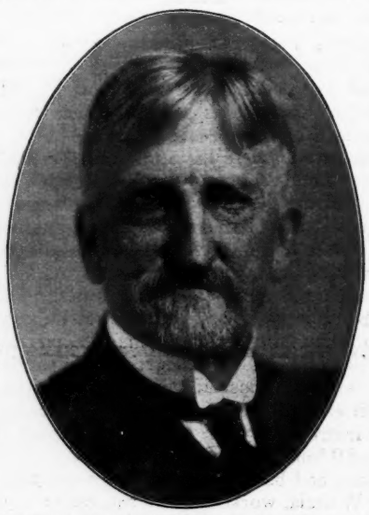
Thomas Riggs, Jr.

William C. Edes, who has recently been appointed chairman of the Alaska Railroad Commission, was born at Bolton, Mass., on January 14, 1856, and graduated from the Massachusetts Institute of Technology in 1875. He entered railway service three years later and was engaged in railway location work on the Southern Pacific in Arizona, New Mexico and Texas until 1882. For a while he was then employed in private practice in Massachusetts, but in 1886 returned to become assistant engineer of the Southern Pacific Company on location and construction. He was engaged in that work for ten years, and during that time had charge of the construction of a portion of the Oregon & California. In 1896 he became assistant engineer of the San Francisco & San Joaquin Valley. In 1901 he was appointed assistant engineer of the Southern Pacific Company on location of new lines and supervised the location work for the reconstruction of some of the Southern Pacific's mountain lines, including the Central Pacific from Rocklin to Truckee, Cal. In 1905 Mr. Edes became district engineer of maintenance of way, with offices at San Francisco. Since 1907 he has also been chief engineer of the Northwestern Pacific, and in charge of the very difficult work of constructing that road.



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W. C. Edes

COURT NEWS

A suit to annul the charter of the Missouri, Kansas & Texas has been filed by Kansas state officers at Independence, Kan. It is desired to dissolve the company and have a receiver appointed on the ground that the company has violated its charter provisions by removing the general offices from Kansas to St. Louis.

The Cleveland, Cincinnati, Chicago & St. Louis and the Chicago, Indiana & Southern were each fined $7,500 in the United States District Court in East St. Louis on May 14, after pleading guilty to charges of allowing illegal rate concessions to the O'Gara Coal Company on shipments of coal.

A consent decree has been entered by the federal court at Little Rock, Ark., in the controversy between the state of Arkansas and the Chicago, Rock Island & Pacific, involving the settlement of the freight and passenger overcharges in the rate cases pending in the federal court. According to the terms the Rock Island is to pay $30,000 on the claims for overcharges in passenger rates, to be paid in assignable mileage. This practically covers the amount of the claims. The road is also to pay $100,000 in full settlement of the claims for freight overcharges, which is to be paid in cash and is not quite half of the amount of the claims. The railroad is also to pay all costs. The money and mileage are to be turned over to the Arkansas Railroad Commission, which will pass on the claims.

Mail-Weighing Rules Still Unsettled

The Court of Claims at Washington on Monday of this week issued a decision reversing its own former decision, in the case of the Chicago & Alton, on the question of the rightfulness of the rule of the post office department to include Sundays as a working day in making computations, under the law, to determine the rate of compensation to be paid to railroads for carrying the mails. The earlier decision of the court, rejecting the government's contention, was reported in the *Railway Age Gazette*, June 20, 1913, page 1532.

Decisions Under the Hours of Service Act

The United States District Court for the Eastern District of Washington, Northern Division, Judge Rudkin, in a case against the Oregon-Washington Railroad & Navigation Company, holds that the safety-appliance act and kindred statutes impose positive and absolute duties on carriers the non-performance of which is not excused by the exercise of reasonable diligence or due care on their part. The hours of service act admits of no other rational construction. The word "permit," as used in the statute, means a failure to prohibit by one who has the power and authority to do so. The expression "all its officers and agents," as used in the statute, cannot be limited to general officers and agents, since the knowledge of such officers and agents was imputable to carriers by the common law, and the hours of service act is more than merely declaratory of the common law.

Neither the lack of actual knowledge on the part of the defendant that the act was being violated nor its previous instructions to the contrary is a defense to an action for the penalty prescribed. In this case the basis of the alleged violation was the excess service of a telegraph operator in a continuously operated day and night office, on 10 consecutive days. The employee had been positively instructed by his superior officer not to remain on duty in excess of 9 hours in any 24-hour period, and his violation of such instructions had been unknown to the company. An agent, Longabaugh, at Wallula, worked for 10 successive days from 7 a. m. to midnight. Before he had performed any excessive hours of service he was instructed by his superior officer not to work in excess of 9 hours in any 24-hour period, either as agent or operator, or in both capacities, and he remained on duty for a longer period than 9 successive hours in violation of such instructions and without the actual knowledge of his superior officers.

In the same court, in a case against the Northern Pacific, where the period of service of a given train crew ended 17 hours and 30 minutes after its inception, though in the interim the men were entirely relieved from duty for a predetermined period of 1 hour and 30 minutes, a watchman then being in charge of the train, it was held that such a lay off or release from duty, even though for a *definite* period, does not break the continuity of service within the meaning of the hours of service act. The road was fined $600. The decision says: "The purpose of the statute is plain, and it must be so construed as to promote its policy. The hours of service of railway trainmen are long at best, leaving only 8 hours for rest and recreation, and if this brief period can be broken into fragments the purpose and policy of the law will be entirely frustrated. If a train crew may be laid off for an hour and a half at one point to suit the convenience or necessities of the company, it may be laid off for a like period at another, and the members of the crew thus wholly deprived of any substantial period for either sleep or rest."

In a case against the Northern Pacific the United States District Court for the Western District of Washington, Judge Cushman, holds:

1. An employee [on a train] goes on duty, within the meaning of the law, at the time he reports for work, and begins the work of looking after his train and seeing that it is in proper condition for road service. He remains on duty while he is in charge of his train, performing service in and about the same, or held responsible for the performance of such service should the occasion therefor arise.
2. An employee is not off duty until he is relieved from all responsibility as to his train and becomes his own free agent to go and do as he pleases. Brief interruptions, such as time necessary for meals while on the road, meeting trains, waiting for orders, delays on account of congestion of traffic, can not be considered as time off duty, although during such detention no active service whatever may be required of such employee.
3. After an employee in train service starts on his trip he can not be said to be off duty, within the meaning of the law, until he reaches the end of his run, unless before reaching his destination he is released from all service in connection with his train, or from all responsibility therefor should the occasion arise, and is given an unqualified, bona fide release, and for a definite and substantial period.
4. A bona fide release is one given to the employee for the purpose of giving him an opportunity for rest, and not given merely to cover a delay at a certain place which the company knows must be encountered, hoping thereby to evade the law.

One of the instances which figured in this suit is reported as follows:

"After extra 59 had completed its work and was ready to leave Snohomish it was seen that on account of a congestion of traffic and the delayed arrival of opposing trains it could not leave that place for some time; under the practice of the company the conductor wired the despatcher, requesting a release for approximately the time he saw they would be delayed at Snohomish, and a message was sent him to put his train in charge of a watchman and go 'on release' for 2 hours and 45 minutes.

A similar message of release was sent to a conductor to cover a delay which the carrier knew would be encountered on account of the coal-bunker machinery being out of order and having to coal the engine by hand.

Parcel-Checking Is Not a Carrier's Business

The Appellate Division of the Supreme Court of New York on May 15 decided that parcel checking in a railway station is not a matter over which the Public Service Commission of the state has jurisdiction. Railways are not compelled to check parcels, but if they do, or if they grant that privilege to others, the charges and the character of the accommodations furnished are not open to question.

The matter came up through a complaint that the charge of 10 cents for checking a parcel at the Grand Central station, New York City, was excessive. The New York Central at the hearing before the commission declared that it had left the privilege to W. H. Mendel.

Mr. Mendel flatly refused to answer questions as to his profits. It had been brought out that he was paying the New York Central $35,000 a year for his privilege, and that he was at the head of a corporation capitalized at $50,000; but the commission was unable to get further information. The commission called Mr. Mendel before the Supreme Court, which held him in contempt, but the Appellate Division on appeal has let him off.

The opinion was written by Justice John Proctor Clarke, who held that a temporary depository of packages was no more a compulsory equipment for a railroad station than a barber shop, a bootblack stand, a candy booth, or a lunch counter.

"A hotel has been erected upon the property of the railroad company near Forty-second street," said the judge, "and there is in contemplation the erection of a private club. While it might be proper in each instance to inquire into the terms of the railroad's lease for such properties, is it reasonable to suppose that it would be within the jurisdiction of the commission to investigate the private affairs of such lessee corporations as to the prices they charged to or the profits they made from those voluntarily seeking the conveniences tendered?"

Railway Officers

Executive, Financial, Legal and Accounting

Fred T. Dickerson, assistant secretary of the Central of New Jersey at New York, has been appointed assistant to the president, with headquarters at New York. He was born on January 28, 1867, at Ramapo, N. Y., and was educated in the public schools. He also took a course in a New Jersey business college. In 1883 he studied telegraphy while serving as a telegraph messenger for the Delaware, Lackawanna & Western at Roseville avenue, Newark, N. J., and in April, 1884, entered the service of the Central of New Jersey as operator and assistant agent at Lake Hopatcong. Subsequently he was appointed agent and operator at that station, and later had charge of other and larger stations. He served also for two years in the trainmaster's office. He was transferred in 1891 to the general offices of the same company at New York as clerk. Five years later he was appointed chief clerk to the controller, and later was advanced to chief clerk to the vice-president and general manager. In 1907 he was elected assistant secretary, continuing also to perform the duties of chief clerk. Mr. Dickerson's entire service of 30 years has been with the Central of New Jersey. In his conduct of the office of chief clerk he has made of his work a fine art, and his new title, making him "assistant to" Mr. Besler only describes what he has been all the time.

F. T. Dickerson

Joseph H. Young, formerly president of the Spokane, Portland & Seattle and the Oregon Trunk, has been elected president of the Norfolk Southern, with headquarters at Norfolk, Va., succeeding Charles H. Hix, resigned. Mr. Young was born on January 17, 1864, at Salt Lake City, Utah, and was educated at the University of Utah. He began railway work in 1882 with the Utah Central as office boy and warehouseman, and was later agent and operator at various stations, and then bill clerk on the same road. He was with the Union Pacific as ticket clerk and train agent at Ogden, Utah, from 1883 to 1886, and was superintendent of the Utah division of the same road, now the O. S. L., from 1891 to 1902. From 1886 to 1889 he was traveling passenger agent of the Chicago & North Western, and then to 1891 was general agent of the Salt Lake & Eastern, and general superintendent of the Utah Central. Mr. Young was general superintendent of the Rio Grande Western, now part of the Denver & Rio Grande, at Salt Lake City, for two years from 1902, and then became general superintendent and later general manager of the Colorado & Southern at Denver. For a short time during 1907 he was general superintendent of the St. Louis & San Francisco. He was general superintendent of the Southern Pacific at San Francisco from 1907 to 1910, and in the latter year was elected president of the Alaska Steamship Company, the Northwestern Steamship Company, Ltd., the Northwestern Commercial Company, the Northwestern Fisheries Company, and the North Coast Lighterage Company, and vice-president of the Copper River & Northwestern. From May, 1912, to January, 1914, he was president of the Spokane, Portland & Seattle, the Oregon Trunk Railway, the Oregon Electric Railway, the United Railways, the Spokane & Inland Empire, the Pacific & Eastern, and the Dalles, Portland & Astoria Navigation Company, with office at Portland, Ore., and now becomes president of the Norfolk Southern, as noted above.

J. H. Young

Albert T. Clifton has been appointed secretary and treasurer of the Texas Central, with headquarters at Waco, Tex., succeeding K. Bowerfind.

E. C. Bagwell, assistant engineer of the Seaboard Air Line at Norfolk, Va., has been appointed president's assistant, with headquarters at Norfolk.

S. W. Greaves, assistant auditor of the St. Louis Southwestern of Texas at Tyler, Tex., has been appointed freight and passenger accountant of the St. Louis Southwestern at St. Louis, Mo., succeeding Charlton Messick, promoted.

Operating.

J. R. Peebles has been appointed general manager of the Tavares & Gulf, with office at Tavares, Fla., succeeding C. A. Carpenter, resigned to go to another company.

J. H. Jackson, who has been connected with the office of the general superintendent of transportation of the Baltimore & Ohio at Baltimore, Md., has been appointed superintendent of the Newark division, with headquarters at Newark, Ohio, succeeding C. W. Gorsuch, who has been assigned to other duties; effective May 14.

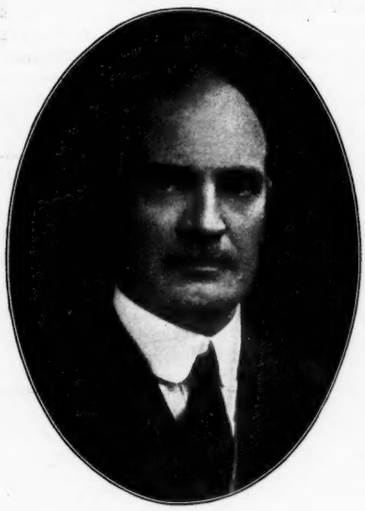
W. D. Cantillon, general manager of the Chicago & North Western lines east of the Missouri river, after 40 years of continuous and faithful service, having by reason of illness requested relief from active duties, the following appointments are effective May 18: S. G. Strickland, assistant general manager, succeeds Mr. Cantillon, with headquarters at Chicago. W. J. Towne, general superintendent of the lines in Illinois, Iowa, Wisconsin and Michigan, takes the place of Mr. Strickland, with headquarters at Chicago, and G. B. Vilas, assistant general superintendent of the lines in Illinois, Iowa, Wisconsin and Michigan, succeeds Mr. Towne as general superintendent of those lines, with office at Chicago.

W. D. Cantillon

Mr. Cantillon was born August 5, 1861, at Janesville, Wis. He was educated in the common schools and began railway work as brakeman for the Chicago & North Western. He was subsequently conductor, and from 1891 to 1893, was trainmaster at Milwaukee, Wis. The following four years he was division superintendent at Winona, Minn., being made assistant general superintendent in 1901. In July, 1902, he was promoted to general superintendent, and on January 24, 1906, he was made assistant general manager, which position he retained until he was appointed general manager of the lines east of the Missouri river, on November 1, 1910.

Mr. Strickland, who was born August 15, 1859, was educated

at the Collegiate Institute and grammar schools at Port Hope and Peterboro, Ont. He commenced railway work in 1877 with the Canadian Pacific as an operator, and from 1878 to 1880, was operator and clerk for the St. Paul, Minneapolis & Manitoba. He was then until 1892 successively telegrapher, clerk, agent and general agent for the Chicago, St. Paul, Minneapolis & Omaha, and the following four years was agent and superintendent of terminals at St. Paul, Minn. He was then made chief clerk to the general superintendent; from 1898 to 1900, was trainmaster and assistant superintendent; from the latter date to 1905, superintendent at Omaha, Neb., and the succeeding three years general superintendent of the same road at St. Paul. Mr. Strickland in 1908 then became assistant general superintendent of the Chicago & North Western, being made general superintendent in 1910, and assistant general manager at Chicago on April 1, 1912. He is now promoted from the latter position to that of general manager, as above noted.



S. G. Strickland

Mr. Towne was born at Leavenworth, Kan., November 28, 1867, and was graduated from Rensselaer Polytechnic Institute in 1895. He entered railway service in 1886 with the Atchison, Topeka & Santa Fe as a rodman in an engineering party. He was subsequently until 1891 instrumentman and assistant engineer, and the following four years he attended college. From 1896 to 1899, he was assistant engineer New York State Canals, and in February of the latter year he went to the Chicago & North Western as assistant engineer construction at Boone, Iowa. He was then successively assistant engineer at Kaukauna, Wis., and Escanaba, Mich., until 1902, when he was made division engineer at Baraboo, Wis. In July, 1904, he returned to Escanaba as division engineer, and in October of that year he was made division engineer at Chicago. From March to July, 1906, he was engineer of permanent improvements, being appointed engineer maintenance of way on the latter date, which position he held until April, 1912, when he was made general superintendent at Chicago, from which office he is now promoted to that of assistant general manager, as above mentioned.

W. J. Towne

Traffic

Herman Weig, general agent of the White Pass & Yukon at Chicago, has been appointed general tourist agent at that place.

H. F. Sanborn has been appointed general agent of the freight department of the Great Northern at St. Paul, Minn., vice R. M. Smith, resigned to engage in other business.

C. A. Carpenter, general manager of the Tavares & Gulf, at Tavares, Fla., has been appointed assistant general freight agent of the Seaboard Air Line, with office at Jacksonville, Fla., succeeding A. J. Fox, transferred.

Engineering and Rolling Stock

M. C. Cleveland, engineer of maintenance of way, of the Chicago, Indiana & Southern, at Gibson, Ind., has been appointed valuation engineer of the Lehigh Valley, with headquarters at New York.

OBITUARY

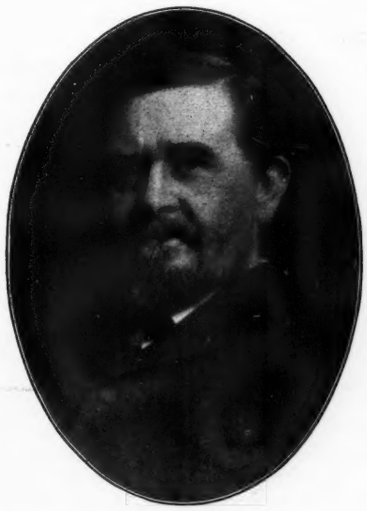
Irving Mitchell, formerly for 26 years general dairy agent of the Chicago, Rock Island & Pacific, died on May 12, at his home in Vinton, Iowa.

Edmund A. Williams, formerly general passenger and ticket agent of the Chicago, Peoria & St. Louis, died at St. Louis, Mo., May 9, aged 51 years.

Eben R. Smith, superintendent of terminals of the Texas & Pacific at El Paso, Tex., died in that city on May 11, aged 62 years. He had been in the employ of the Texas & Pacific for 41 years.

Martin Luther Gardner, assistant to the principal assistant engineer of the New Jersey division of the Pennsylvania Railroad, with headquarters at New York, died on May 14 at his home in Newark, N. J., at the age of 51.

William Wainwright, vice-president of the Grand Trunk, and the Grand Trunk Pacific, died on May 14 at Atlantic City, N. J., at the age of 74. He was the senior member of the Grand Trunk family, and was held in high regard by every man on the system. He had a railroad record almost unparalleled from 1858 to 1914. Modern railroad conditions were largely undreamed of when he began his career on the Manchester, Sheffield & Lancashire 56 years ago. He went to school in Manchester and entered the office of an American shipping firm. In his eighteenth year he took a junior clerkship on the Manchester, Sheffield & Lancashire, and was rapidly promoted; but in 1862 he went to Canada, entering the general accountant's office of the Grand Trunk at Montreal. His first promotion was to the position of secretary to the managing director, and in that capacity he continued for three years. He next filled the office of senior clerk in the managing director's department and took charge of car mileage. After a few years he was appointed general passenger agent and remained in that position eight years. In May, 1881, he was appointed assistant manager of the road. In 1896 he was given the title of general assistant to the general manager, and in addition to that office took up, in 1900, the duties of comptroller. Seven years ago he was made fourth vice-president. In January, 1910, he became second vice-president of the Grand Trunk, and also second vice-president of the Grand Trunk Pacific. In the following year he took rank as senior vice-president of the Grand Trunk system. He had an intimate and thorough knowledge of the finance, history and physical character of the Grand Trunk, and he presented the railway's problems in Parliament at Ottawa. He impressed everyone he met with his fine qualities—his large experience, solid judgment, great energy, and kindly geniality. He thus won and retained the respect of all with whom he came in contact; and until the very last he remained mentally alert. He was a director of the Montreal Telegraph Company and vice-president of the Richelieu & Ontario Navigation Company; a director of the Canadian Express Company, and a governor of the Montreal General Hospital. For eight years he commanded a company of artillery in the old Grand Trunk brigade.



W. Wainwright

Equipment and Supplies

LOCOMOTIVE BUILDING

The New Orleans & Northeastern has ordered 3 mikado and 5 Pacific type locomotives from the Baldwin Locomotive Works.

The Chicago & North Western has ordered 15 Pacific type and 25 mikado type locomotives from the American Locomotive Company.

The Laurel River Lumber Company, Jenningston, W. Va., has ordered one mogul type locomotive from the Baldwin Locomotive Works.

The Seaboard Air Line, reported in the *Railway Age Gazette* of last week as contemplating the purchase of 10 passenger and 15 freight locomotives, will buy 10 mountain type and 15 mikado type locomotives.

CAR BUILDING

The Havana Central is in the market for 150 25-ton flat cars and 100 cane car trucks.

The Missouri & North Arkansas has ordered one gas-electric car from the General Electric Company.

The Chicago & North Western has ordered 3,000 40-ton box cars from the American Car & Foundry Company, and is now in the market for 250 ballast cars.

The Seaboard Air Line is in the market for 400 steel underframe ventilator box cars and 12 coaches and 9 passenger and baggage, 5 mail and baggage, 9 express and 7 mail cars. The passenger cars are to be of all-steel construction.

Proposed Railway Extension in Jamaica.—The Jamaica Legislative Council has made an appropriation for the survey of a branch line from Highgate, a village on the government railway which connects Kingston and Port Antonio, 20 miles through the western section of the parish of St. Mary to Gayle. The main object is to provide the planters with better means for marketing their products. St. Mary holds first place in Jamaica for growing bananas, and although the section through which it is proposed to construct the branch is one of the most productive there is still much uncultivated land, owing to the lack of transportation facilities. The planters must now haul their fruit long distances over rough roads and the bunches often arrive at the seaport or station so bruised that the buyers refuse to take them. The government will probably await the report of the surveyor before taking further action. Efforts are also being made to have a line built from Gayle to Port Maria, but the plan has not yet been sanctioned.

Financing the Bosnian Railway Improvements.—The Austria-Hungary minister of finance has arranged with a group of German banks for the issue of a loan of $55,000,000 to cover part of the expenditure required for the development of the railway system of Bosnia and Herzegovina. It is expected, however, that of this sum only about $6,000,000—that is, sufficient to pay for work to be carried out this year—will be issued at present. The loan will bear 5 per cent. interest, and is redeemable in 60 years by contributions from Austria-Hungary and Bosnia-Herzegovina. The completion of the whole scheme, which was sanctioned by the Bosnian Diet about 18 months ago and by the Hungarian parliament last autumn, but which in Austria has been promulgated by imperial decree, owing to the prorogation of the Reichsrat, requires the addition to this $55,000,000 of another $122,000,000. Austria and Hungary will provide this in the usual proportions. The work is reckoned to take six years. The main purpose is the development of the railway system of Bosnia-Herzegovina for strategic purposes, by transforming the various sections of the existing narrow gage system to normal gage and the construction of new lines.

Supply Trade News

J. Howard Ewald, president of the Pittsburg Forge & Iron Company, died at his home in Kirkwood county, Mo., on May 18.

C. P. Williams, recently of the National Lock Washer Company, has become connected with The Efficiency Company, Railway Exchange, Chicago.

The Morden Frog & Crossing Works has announced the removal of its city sales office to the Continental and Commercial Bank building, 208 South La Salle street, Chicago.

The Smith locomotive adjustable hub plate has been specified on the 30 Missouri, Kansas & Texas locomotives, order for which was recently placed with the American Locomotive Company.

The Haskell & Barker Car Company will use four ply of one-half-inch "linofelt" for insulating the 1,000 refrigerator cars to be built for the Great Northern Railway. This insulation is furnished by the Union Fibre Company, of Winona, Minn.

T. B. Bowman, for the past five years assistant to the president and eastern sales manager of the Q & C Company, New York, and for the past three months in charge of the western territory, has severed his connection with that company to become president of The Efficiency Company, with office in the Railway Exchange, Chicago.

The United States Steel Corporation proposes to have a very comprehensive exhibit of its operations at the Panama-Pacific Exposition at San Francisco next year. There will be presented an educative picture of the mining of ore, its transportation by rail and water, its handling at the docks and of the production of coal, coke, pig iron and the various types of steel products. The utilization of by-products and the uses to which the general products are put will also be illustrated. These material exhibits will be supplemented by moving pictures showing the corporation's work in all its branches. The work that is being done toward the social welfare of the employees, the forms of safety devices that are being used, and similar matters will also be considered.

TRADE PUBLICATIONS

Air Hoists.—The Whiting Foundry Equipment Company, Harvey, Ill., has recently issued catalog No. 107 describing the company's line of air hoists and accessories.

Pneumatic Tools.—Bulletin No. 154, issued by the Chicago Pneumatic Tool Company, describes the "Chicago Stoper." This was incorrectly referred to in our issue of April 17 as the "Chicago Stoker."

Chemical Weeding.—The Atlas Preservative Company of America, Inc., New York, has issued a little booklet concerning the progress of chemical weeding which aims to show that rank growth of weeds can be eradicated with minimum quantities of Atlas "A" at a cost of from eight to ten dollars a mile, provided a slight regrowth is not an objection and appearances are secondary.

Denver & Rio Grande.—An exposition leaflet, "Condensed Facts," replete with matters of interest concerning the Panama-Pacific International Exposition, historical data in connection with the inception of the idea, names of officers, list of states and foreign countries participating and a general description of the site, buildings and illuminations, together with information for exhibitors, is now being distributed by the passenger department.

Safety Appliances.—The Consolidated Expanded Metal Companies, Rankin, Pa., have issued a catalog descriptive of "Steelcrete" mesh for partitions and safety guards. The "Steelcrete" is a cold drawn mesh, made from open hearth steel. Its advantages are said to lie in its simplicity of construction, in the fact that the parts of the machine which it protects are accessible, visible and well ventilated and in the ease with which the machine may be oiled or inspected.

Railway Construction

CHEHALIS & COWLITZ.—See Washington Electric.

CONNECTICUT ROADS.—Plans are being made to build a line from Putnam, in Windham county, Conn., southwest via Woodstock and Eastford to Ashford, thence northwest to Stafford Spring, about 25 miles. W. H. Seely, Boston, Mass. G. W. Perry and G. L. Baldwin, Putnam, Conn., are interested.

ELBERTON & EASTERN.—This company has given a contract, it is said, to build an extension from Tignall, Ga., south to Washington, 12.5 miles. (December 19, p. 1207.)

GALVESTON, HARRISBURG & SAN ANTONIO.—This company is building a 13-mile interurban loop line, it is said, from the existing line at a point one-half mile from La Porte, Tex., to Seabrook. The work is expected to be finished in August.

ILLINOIS ROADS (Electric).—We are told that plans are being made to build from Henry, Ill., northwest via Bradford to Kewanee, 37 miles. C. G. Lampman, Cedar Rapids, Ia., is interested in the project. (March 20, p. 703.)

KLICKITAT NORTHERN.—Incorporated in the state of Washington with $100,000 capital and headquarters at Vancouver, Wash. The plans call for building from Wright's Station on the Spokane, Portland & Seattle, northwest towards Camas Prairie, and the incorporators include F. A. Bennett, F. A. Kidson and A. L. Miller.

LAFAYETTE & NORTHWESTERN (Electric).—Incorporated in Indiana with $100,000 capital, and headquarters at Lafayette. The plans call for building an electric line from Lafayette, Ind., northwest to Kankakee, Ill., about 75 miles. G. J. Thomson may be addressed.

NEW YORK SUBWAYS.—Bids for the construction of section No. 1-A of routes Nos. 4 and 38 of the Seventh avenue subway in the borough of Manhattan, will be opened by the New York Public Service Commission, First district, on June 9. This section covers the connection between the new Seventh avenue subway and the existing subway at the Battery. The work includes building a new station opposite the present station at South Ferry.

NORTHERN RAILWAY.—An officer is quoted as saying that work is to be started this spring on a line from Montreal, Que., to a point on the east side of James Bay, about 550 miles. C. A. Smith, vice-president and general manager, Montreal, Que.

OGDEN, LEWISTON & NORTHERN (Electric).—According to press reports, this company will start work soon on the line projected about a year ago from Ogden, Utah, north through Ogden canyon and over the divide into Cache valley, thence north into Preston, Idaho, about 65 miles. F. W. Crockett, president, Logan, Utah; A. L. Hyer, vice-president; M. J. Swinyard, secretary and treasurer, Lewiston, Idaho. (May 16, 1913, p. 1115.)

OHIO & PENNSYLVANIA BELT.—An officer writes that it has not yet been decided when bids will be asked for building from Lowellville, Ohio, to Struthers. R. Bentley, president; D. M. Wise, chief engineer, Youngstown, Ohio. (May 1, p. 1011.)

QUANAH, ACME & PACIFIC.—Announcement is made that work on the extension from Roaring Springs, Tex., west to Roswell, N. Mex., about 290 miles, will be started as soon as the contracts can be let and the necessary material assembled. Surveys for the extension have been made. The company now operates 79 miles from Quanah, Tex., to Roaring Springs. (January 16, p. 150.)

READING, BIRDSBORO & POTTSTOWN (Electric).—We are told that surveys have been made and contracts are to be let soon to build from Reading, Pa., southeast via Millmont to Gibraltar, about six miles. The line is eventually to be extended east about 20 miles through Seyfert, Robeson and Birdsboro to Pottstown. Plans have been made by the Reading Bridge & Warehouse Company, to build a steel bridge over the Schuylkill river, the Pennsylvania Railroad and the Philadelphia & Reading tracks at Reading, to cost about $200,000. W. Abbott Whitman, president, and W. H. Deeland, engineer, Reading.

SAN ANTONIO TRACTION.—According to press reports, this company, which operates street railways in San Antonio, Tex., is planning to build an interurban line from San Antonio northeast via New Braunfels, Hunter, San Marcos, Kyle and Buda to Austin, about 85 miles.

SUTHERLIN, COOS BAY & EASTERN.—Surveys will be started at once, it is said, for a line to be built from Sutherlin, Ore., into a timber belt at a point 27 miles east of that place. J. F. Luse, Sutherlin, may be addressed.

TEXAS MIDLAND.—According to press reports, this company has had surveys made for a line between Greenville, Tex., and Commerce, about 14 miles. This company now operates over the tracks of the St. Louis Southwestern between these two places.

WASHINGTON ELECTRIC.—According to press reports, arrangements have been made to start work soon on a ten-mile extension of the Chehalis & Cowlitz. The line now extends from Chehalis, Wash., east to Newaukum prairie, 8 miles.

WATERLOO, CEDAR FALLS & NORTHERN (Electric).—This company has opened for freight service the extension between Center Point, Ia., and Cedar Rapids, 18 miles. (December 5, p. 1100.)

WINNIPEG ELECTRIC.—According to press reports, a contract has been let to Kelpin Brothers, Stony Mountain, Man., to build an extension of the Winnipeg, Selkirk & Lake Winnipeg, from Stony Mountain to Stonewall. The company expects to have the work finished by July.

WINNIPEG, SELKIRK & LAKE WINNIPEG.—See Winnipeg Electric.

RAILWAY STRUCTURES

CHARLESTON, W. VA.—We are told that a contract for the foundation of a steel bridge to be built for the Kanawha City Bridge Company over the Kanawha river has been let to D. Minotti, Charleston, W. Va., and contract for, fabricating and erecting the steel superstructure to the American Bridge Company, New York. The bridge is to have one deck and two through spans of 120, 416 and 236 ft., and it will be 75 ft. above low water. The estimated cost of the bridge, which is to be a combined highway and street railway bridge, is $255,000.

CHICAGO, ILL.—The Chicago & North Western has asked for bids on a new inbound freight house, estimated to cost $55,000, to be built at Fourteenth and Webster streets.

COVINGTON, KY.—We are told that the South Covington & Cincinnati Street Railway Company has given a contract to the American Bridge Company for the fabrication and erection of the steel for a truss bridge over the Licking river from Eleventh street, Newport, to Twelfth street, Covington. The new bridge is to have a main span of 360 ft., and will require 1,175 tons of steel. It will replace an old bridge, on the same site, and the old piers are to be reinforced and used for the new structure. The cost of the improvements will be $160,000.

GRIFFIN, GA.—An officer of the Central of Georgia writes that the company expects to let contracts about July 1 for building a new station at Griffin. The proposed structure is to be of pressed brick construction, with tile roof. The cost of the improvements will be $30,000.

QUEBEC, QUE.—Bids are wanted until noon June 2, 1914, by P. E. Ryan, secretary of the commissioners of the Transcontinental Railway at Ottawa, Ont., for building a railway station and covered platform on the Champlain Market site, in the city of Quebec, on the line of the National Transcontinental.

READING, PA.—See Reading, Birdsboro & Pottstown, under Railway Construction.

SOUTH RICHMOND, VA.—An officer of the Southern Railway writes that a combined freight and passenger station is to be built at South Richmond. The new building will be of brick construction.

Railway Financial News

Arkansas, Louisiana & Gulf.—The *Shreveport Journal* says that this road is to be sold under foreclosure in the near future.

Baltimore & Ohio.—Kuhn, Loeb & Co. and Speyer & Co., both of New York, bought from the company $35,000,000 one-year 4½ per cent. notes dated June 1. Of the proceeds of these notes $20,000,000 will be used to pay off notes maturing July 1, and the remainder for additions and betterments. In commenting on the note issue President Willard said in part: "The arrangement is made for one year only for the reason that the company has in preparation a broad financial policy which it is believed will effectually care for the company's requirements in the future. This plan will probably take the form of a general mortgage combining in a single indenture all of the properties of the system, including the company's Chicago and New York terminals." The notes were offered by the bankers at par with no commission for dealers.

Boston & Maine.—The holders of all of the outstanding notes of the Boston & Maine, approximately $27,000,000, are asked to extend their notes and are offered the following option: (1) Any holder of notes may extend the par amount to March 2, 1915, with interest discounted at the rate of 6 per cent. per year; or (2) any holder may extend 60 per cent. as above and receive for the remaining 40 per cent. 5-year 5 per cent. notes of the Maine Railways Company, secured by Maine Central stock which is now paying 6 per cent.

Canadian Northern.—An amendment to the government's resolution providing for the Dominion of Canada to guarantee $45,000,000 additional Canadian Northern bonds, postponing consideration for six months, was defeated on May 19 by a vote which gave the government a majority of 47.

Chesapeake & Ohio.—In accordance with the decree of the United States District Court, the Chesapeake & Ohio sold its 40,297 shares of Kanawha & Michigan stock to the Lake Shore & Michigan Southern at par. This gives the Lake Shore a clear majority of the Kanawha & Michigan, and since the Chesapeake & Ohio bought the stock in 1910 at $72 a share, this company makes a profit of $28 a share, or about $1,100,000. The total dividends received by the Chesapeake & Ohio on its Kanawha & Michigan stock during the three years which it carried it amounted to 18¾ per cent. This is slightly more than the cost to the Chesapeake & Ohio of carrying this stock. It is understood that the present traffic arrangements between the Kanawha & Michigan and the Chesapeake & Ohio will continue undisturbed.

Chicago & North Western.—This company has asked the railroad commission of Missouri for authority to issue $29,715,000 general mortgage bonds, of the proceeds of the sale of which $22,905,000 is to be used for refunding bonds due in 1915, 1916 and 1917, and $810,000 to be used in retiring sinking fund bonds and $6,000,000 to be used to pay for improvements and additions at the rate of $1,000,000 a year.

Cincinnati, New Orleans & Texas Pacific.—Besides the regular quarterly dividend of 1¼ per cent. and the regular semi-annual dividend of 3 per cent. on the common stock, an extra dividend of 2½ per cent. has been declared on the common stock.

Kanawha & Michigan.—See Chesapeake & Ohio.

Lake Shore & Michigan Southern.—See Chesapeake & Ohio.

Missouri, Kansas & Texas.—The $765,000 5 per cent. equipment trust certificates recently sold by the road, as mentioned in these columns, was taken by a syndicate headed by White, Weld & Co. and Brown Brothers & Co., both of New York, and are being offered at a price to yield 5 per cent. on the investment.

New York Central & Hudson River.—Certain minority stockholders of the New York & Harlem have brought an injunction suit under the Sherman anti-trust law to prevent the consolidation of the New York & Harlem with the New York Central & Hudson River.

New York, New Haven & Hartford.—Charles S. Mellen, formerly president of the New Haven, testifying before the Interstate Commerce Commission in the investigation being held at the direction of the United States Senate, said that throughout the proceedings leading to the purchase of the Westchester & Boston and the New York & Port Chester, he had acted at the suggestion of the late J. P. Morgan and that all of his acts had been ratified by the committee directly in charge of this matter, which consisted of J. P. Morgan, William Rockefeller and George McC. Miller. Mr. Mellen testified that he knew absolutely nothing of the details concerning the expenditure of $11,000,000 for the franchises and work already completed of the two roads which were acquired to form the New York, Westchester & Boston. He admitted that he had voted to approve the report of the expenditure of this money, but claimed that he had protested against the lack of detail in the report and further claimed that he had never received any satisfactory explanation or further details in regard to the report.

Northern Pacific.—A meeting of the stockholders is to be held in New York on June 11 for the purpose of obtaining their consent to an additional and refunding mortgage on the property.

Seaboard Air Line.—The Guaranty Trust Company, New York, is offering at par $2,325,000 Charleston Northern first mortgage 25-year 6 per cent. bonds and $1,250,000 North & South Carolina first mortgage 50-year 6 per cent. bonds, both issues guaranteed principal and interest by the Seaboard Air Line. These two issues of bonds are secured by a first mortgage on 169 miles of road running from Hamlet, N. C., to Charleston, S. C.

Union Pacific.—A quarterly dividend of 2 per cent. has been declared, payable July 1. This is now the regular dividend as The result of the extra distribution on common stock.

Wabash.—The reorganization plan has been filed with the Missouri Public Service Commission. All stockholders are to be assessed $20 per share and preferred stockholders are to receive new stock at par for their old stock and the 20 per cent. assessment, and common stockholders will receive 88 per cent. in new stock for their old stock and the 20 per cent. assessment. Holders of unsecured claims will be paid 50 per cent. It is estimated that $30,280,000 will be needed in cash to carry out the reorganization, and to raise this amount the cash assessment is made and will be supplemented by the issue of $14,000,000 5 per cent. refunding bonds.

A Railway Bridge Across the Danube Between Roumania and Servia.—The Roumanian and Servian governments have agreed to erect a bridge over the Danube, uniting the railways of both countries between the towns of Brza Palanka and Tzisganashi. This bridge will be for a single track and will have an inside width of at least 18 ft., but the arches and approaches are to be prepared with a view to subsequent double tracking. In the erection of the bridge, the connection with the Roumanian railways is naturally left to the Roumanian government and that of the Servian railways to the Servian government. The General Direction of the Works is instructed to employ both Servian and Roumanian engineers.

Lower Freight Rates on the Trans-Andean Railways.—Negotiations have been going on for some months with the end in view of reducing the rates on various classes of merchandise carried between Argentina and Chile over the two trans-Andean railways. The total length of the trans-Andean line is 148 miles. The Argentine portion is administered by the Buenos Ayres & Pacific, and is 100 miles long. The Chilean section, 48 miles in length, is operated by the Chilean Trans-Andean Company. The proposed reductions will amount to about 15 or 20 per cent.; a tentative agreement was made some time ago that 40 per cent. of the reduction would be borne by the Argentine Trans-Andean Company, and the remainder by the Chilean company. The matter was referred to the London board of the latter for approval, but such has been withheld because it is felt that the proportion to be borne by the Chilean company is excessive.